SHOP MANUAL

HONDA
50

MODEL
PC50
PS50

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HONDA

50

MODEL

PC50
PS50

FOREWORD

The PC/PS 50 is a gasoline engine powered bicycle, affording all the simplicities to the bicycle with the powered features of a mopet, yet so easy to handle that anyone who is able to ride a bicycle can ride the PC/PS 50 without any previous experience. It is designed to fulfill the need for a safe, economical and easy handling family transportation.

This manual has been prepared as a servicing guide for the PC/PS 50, and all personnel who will be servicing the PC/PS 50 should read this manual carefully to become familiar with all of its sections.

The manual is written in two parts, construction and maintenance inspection, for easy reference.

Any revisions to this manual will be notified by the Service Bulletin.

April 30, 1968

HONDA MOTOR CO., LTD.

Service Division

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1. FEATURES

(PC 50)

Engine

1. 4-cycle, overhead cam engine
   The 4-cycle, overhead cam engine is employed to minimize the exhaust noise.
2. Specially designed centrifugal clutch
   Transmission of power is by a specially designed centrifugal clutch system. The utilization of the centrifugal clutch eliminates the need for the manual clutch or the transmission units.
3. Pedalling
   An engine disengaging clutch is mounted on the counter shaft. Positioning this clutch in the neutral position will permit cycling in the same way as a bicycle.
4. Decompression system
   The decompression lever is used to decompress the cylinder to decrease the pedal load for starting; also, it serves to shut off the engine.
5. Synthetic resin air cleaner
   The synthetic resin air cleaner is mounted on the left side of the main frame and is easily accessible for servicing. Further it is constructed to provide effective waterproofing.

Frame

1. Low, pressed steel frame
   The low frame has a low center of gravity, designed for easy riding or dismounting. Main member is made of pressed steel sheet halves, joined by welding to produce a rigid unit.
2. Bottom link front suspension
   Front fork is a pressed sheet steel construction of "U" shaped section with the bottom link supported by spring suspension. The top center of the fork jointed to the steering stem.
3. Cable operated brake system
   Both front and rear brakes are internal expanding and operated independently by the handle levers through cables.
4. Swing arm rear suspension
   The rear wheel is mounted on a swing arm spring suspension.
5. Oversize tires
   For improved handling and greater stability, a 2.00–19 size is used on the front and 2.25–19 size is used on the rear.
6. T-type handle
   The handle is a T-type, to a bicycle with a vertical adjustment.
7. Non adjusting stop switch
   Rear brake cable mounted stop switch is operated by the cable movement to open and close the switch contacts, making it unnecessary to adjustment.

(PS 50)

Engine

1. 4-cycle overhead cam engine
   The 4-cycle, chain driven overhead camshaft is employed to minimize noise.
2. Three speed handle grip shift
   The three gear speed selections are made by twisting the handle grip for the riding condition.

3. Pedalling
   Locking the clutch lever with the transmission gear engaged (clutch disengaged) will make pedal operation possible.
4. Synthetic resin air cleaner
   The synthetic resin air cleaner is mounted on the left side of the main frame and is easily accessible for servicing. Further, it is constructed to provide effective waterproofing.

Frame

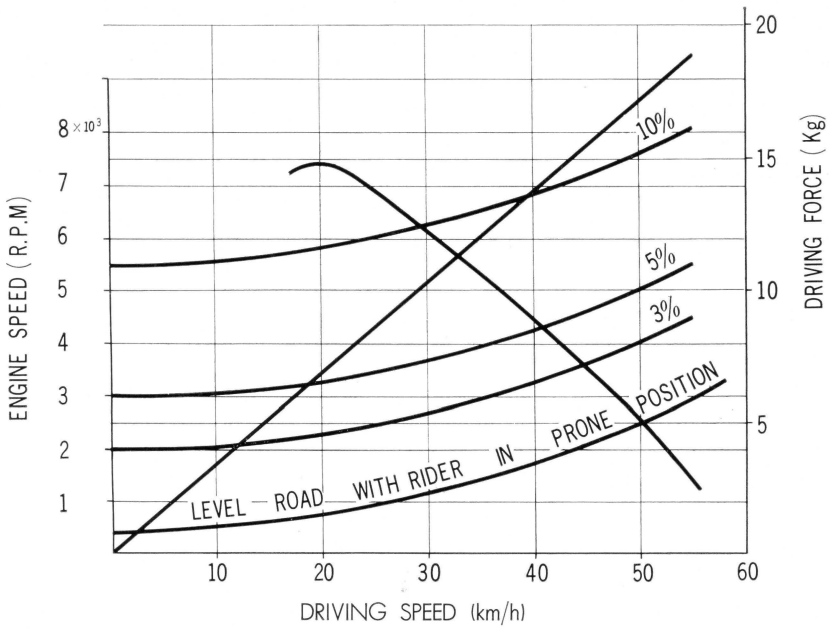
1. Low, pressed steel frame
   The low frame has a low center of gravity, designed for easy riding or dismounting, Main member is made of pressed steel sheet halves, jointed by welding to produce a rigid unit.
2. Telescoping front wheel suspension
   The front fork consists of right and left steel tube jointed at the top by the bottom bridge. Front wheel is supported by the suspension springs contained within the fork tubes to provide the telescoping suspension action.
3. Brake pedal
   Both the front and rear brakes are internal expanding.
   The brakes are independently operated, the front by the right handle lever and the rear by the reversing the pedal.
4. Swing arm rear suspension
   The rear wheel is mounted on a swing arm spring suspension.
5. Oversize tires
   Large size tires are used for improved handling and greater stability, a 2. 00–19 size is used on the front and 2. 25–19 size is used on the rear.

2. SPECIFICATIONS

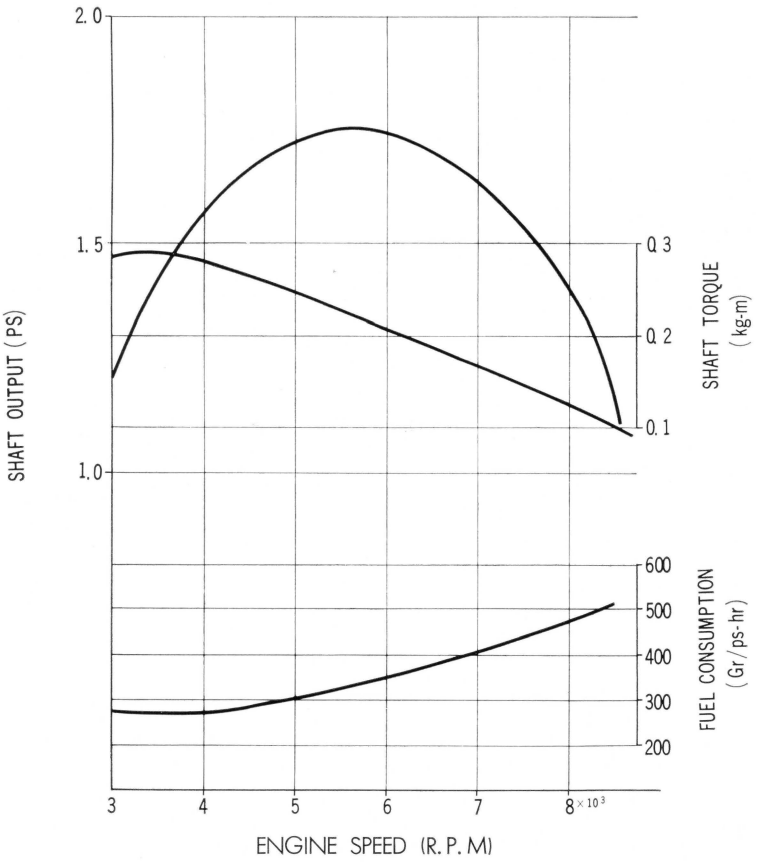
Description	PC 50	PS 50
DIMENSION		
Overall length	1755 mm (69.2 in)	1775 mm (69.9 in)
Overall width	600 mm (23.6 in)	630 mm (24.8 in)
Overall height	1015 mm (40.0 in)	960 mm (37.8 in)
Wheel base	1125 mm (44.3 in)	1145 mm (45.1 in)
Min. ground clearance	150 mm (5.9 in)	150 mm (5.9 in)
WEIGHT		
Weight empty	48 kg (105.5 lb)	54 kg (119 lb)
Empty weight distribution, front	20 kg (44 lb)	25 kg (55 lb)
Empty weight distribution, rear	28 kg (61.7 lb)	29 kg (63.8 lb)
Full load weight distribution, front	41 kg (90.3 lb)	45 kg (99 lb)
Full load weight distribution, rear	82 kg (180.5 lb)	84 kg (185 lb)
PERFORMANCE		
Max. speed	45 kph (28 mph)	50 kph (31 mph)
Fuel consumption	90 km/lit at 25 kph (212 mi/US gal., 254 mi/Imp. gal. at 16 mph)	
Climbing ability	5°	8°
Min. turning circle	2.6 m (8.6 ft)	2.6 m (8.6 ft)
Braking distance	5 m at 25 kph (16.4 ft at 16 mph)	
ENGINE		
Type fuel used	Gasoline	
Type engine	Air cooled, 4 stroke cycle	
No. of cylinder and arrangement	Single cylinder, tilled up 10° from horizontal	
Valve arrangement	Overhead camshaft	
Total piton displacement	49 cc (3.0 cu-in)	
Bore and stroke	42 × 35.6 mm (1.654 × 1.401 in)	
Compression ratio	9.0	
Compression pressure	12 kg/cm^2 (171 lbs/in^2) at 1000 rpm	
Max. output	1.75 ps/5,750 rpm	
Max. torque	0.29 kg-m (2.1 ft-lb)/3,500 rpm	
Min. fuel consumption at max. load	270 gr/ps-h/3,500 rpm	
Total weight	12 kg (26.4 lb)	13 kg (28.6 lb)
Starting method	Pedal starter	
Carburetor No. and type	Single, Side draft piston valve	
Air filter type	Filter paper	
Fuel tank capacity	3.0 lit (0.8 US gal., 0.7 Img. gal)	5.5 lit (1.5 US gal., 1.2 Imp. gal)
Lubrication method	Splash	
Lubrication system capacity	0.8 lit (1.7 US pt., 1.4 Img. pt)	0.9 lit (1.9 US pt., 1.6 Imp. pt)
IGNITION SYSTEM		
Ignition method	Flywheel magneto	

Description	PC 50	PS 50
Ignition coil	High voltage AC	
Type spark plug	C-6HB	
POWER TRANSMISSION SYSTEM		
Primary reduction method	Gear	
Primary reduction ratio	2.833	
Clutch type	Centrifugal, automatic	Single plate, wet
Gear ratios		
1	3.214	4.454
2		2.687
3		1.950
Secondary reduction method	Chain	
Secondary reduction ratio	2.067	2.714
STEERING SYSTEM		
Steering handle turning radius	65°	50°
Steering handle width	570 mm (22.44 in)	590 mm (23.23 in)
Caster	65°	64°30′
Trail	60 mm (2.36 in)	50 mm (1.97 in)
Tire, front	2.00-19	2.00-19
Tire, rear	2.25-19	2.25-19
BRAKE SYSTEM		
Type brake, front	Internal expansion	
Type brake, rear	Internal expansion	
Method of application, front	Right handle lever	
Method of application, rear	Left handle lever	Reversing cycling pedal
SUSPENSION SYSTEM		
Suspension method, front	Bottom link type	Telescopic fork
Suspension method, rear	Swinging arm	Swinging arm
LIGHTING SYSTEM		
Headlight rating	6 V-10 W (For general and U.K export type)	
	6 V-6 W (For France, Belgium and Holland type)	
Taillight rating	6 V-2 W (For general export type)	
	6 V-1.8 W (For France, Belgium and Holland type)	
	6 V-5 W (For U.K type)	
Stoplight rating	6 V-6 W (For general export type)	
	6 V-5 W (For France, Belgium type)	
	6 V-18 W (For U.K type)	

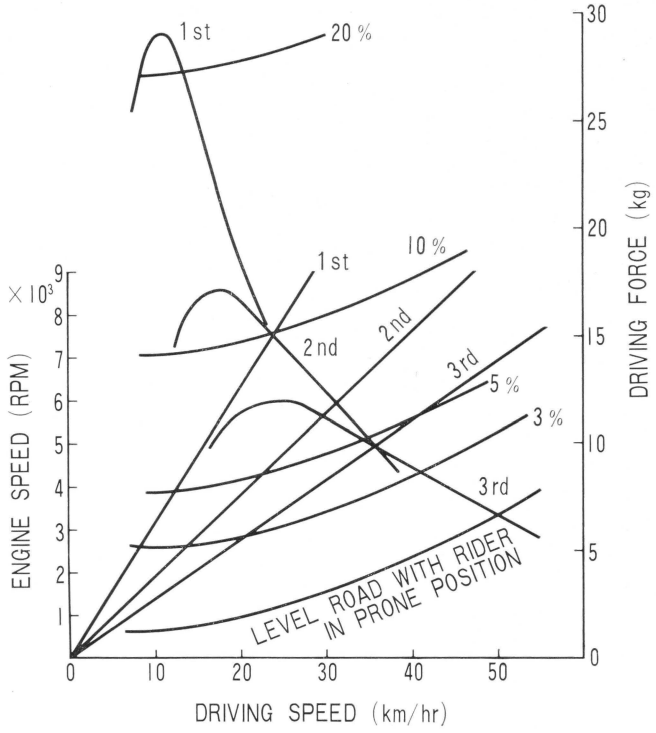
PC 50 DRIVING PERFORMANCE CURVE



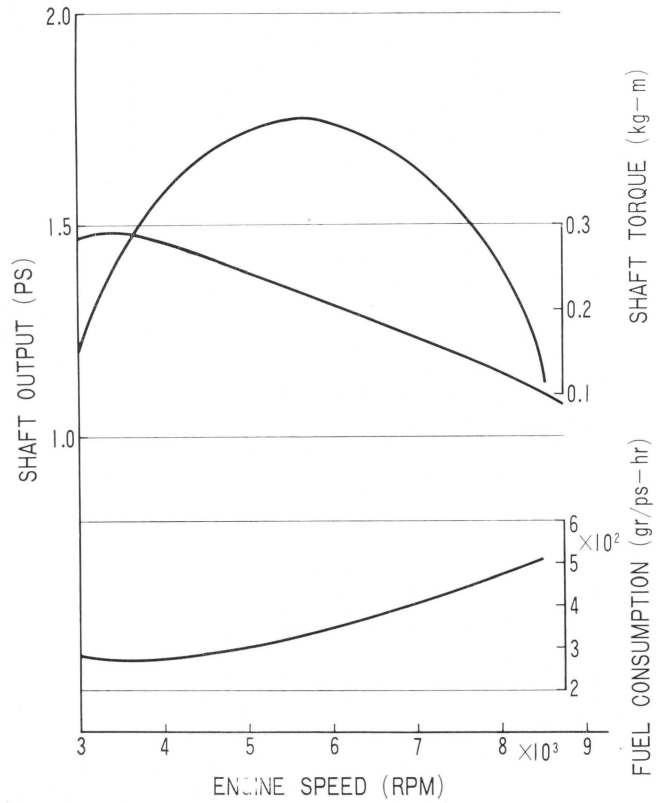
PC 50 ENGINE PERFORMANCE CURVE



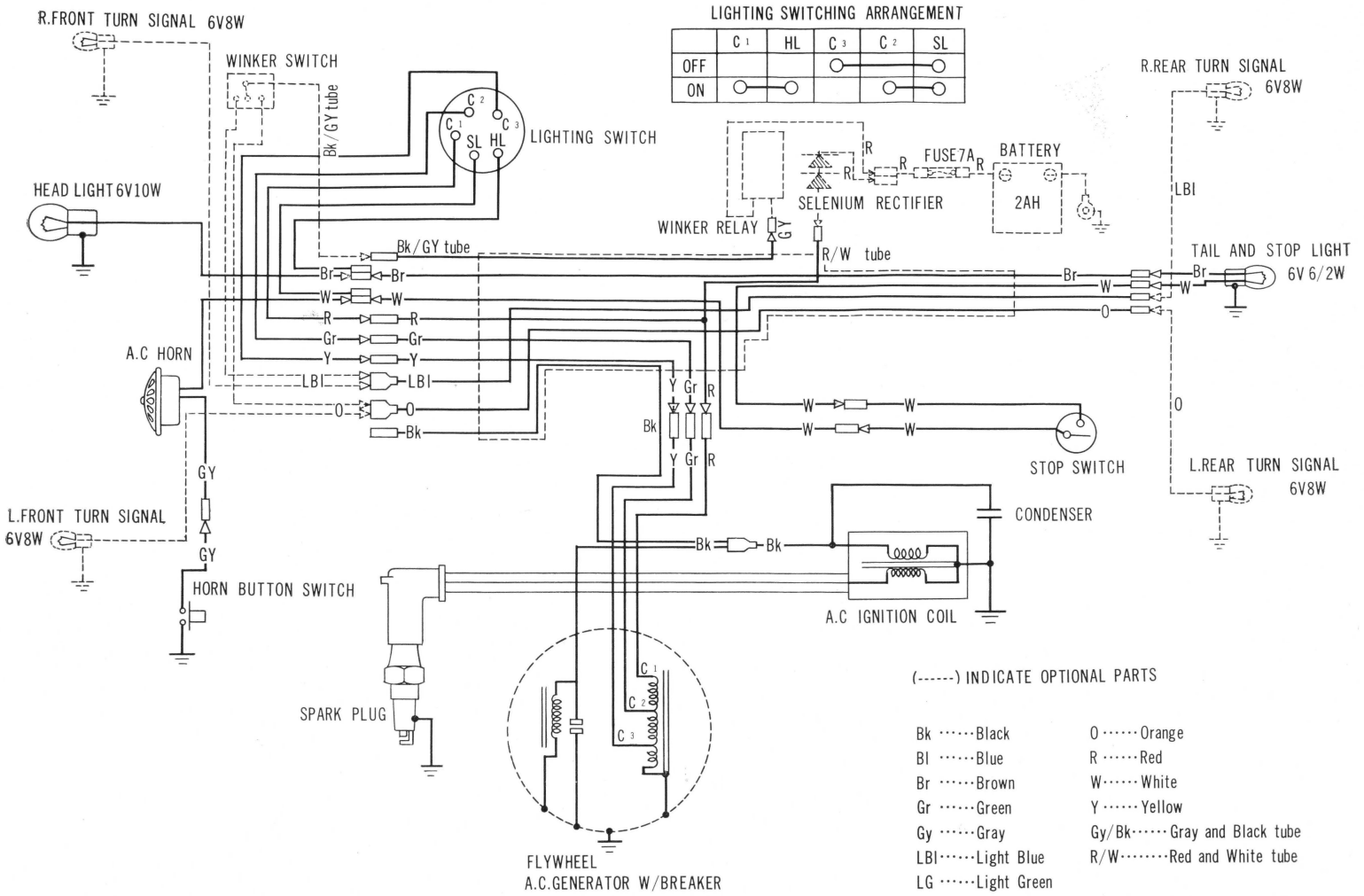
PS 50 DRIVING PERFORMANCE CURVE



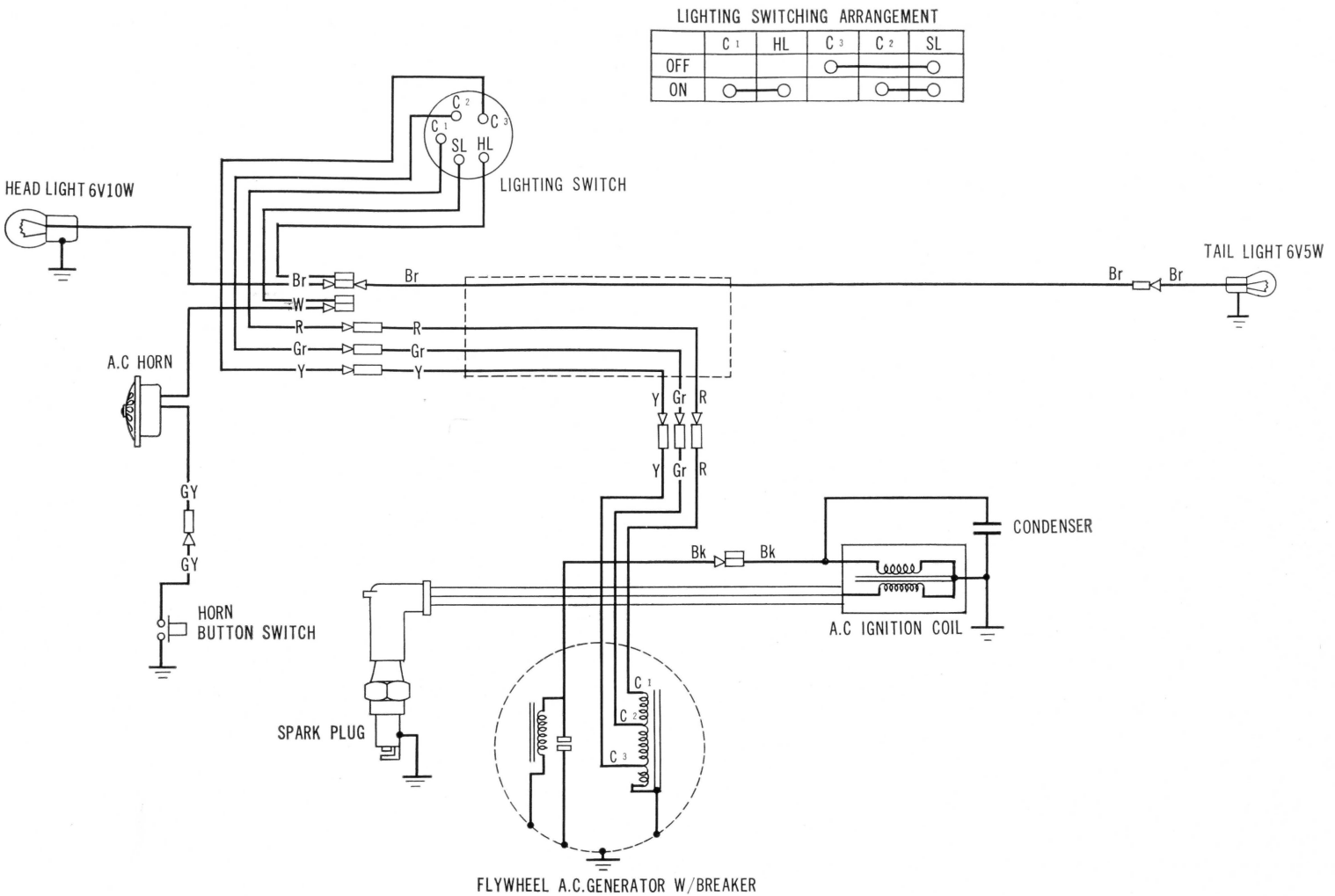
PS 50 ENGINE PERFORMANCE CURVE



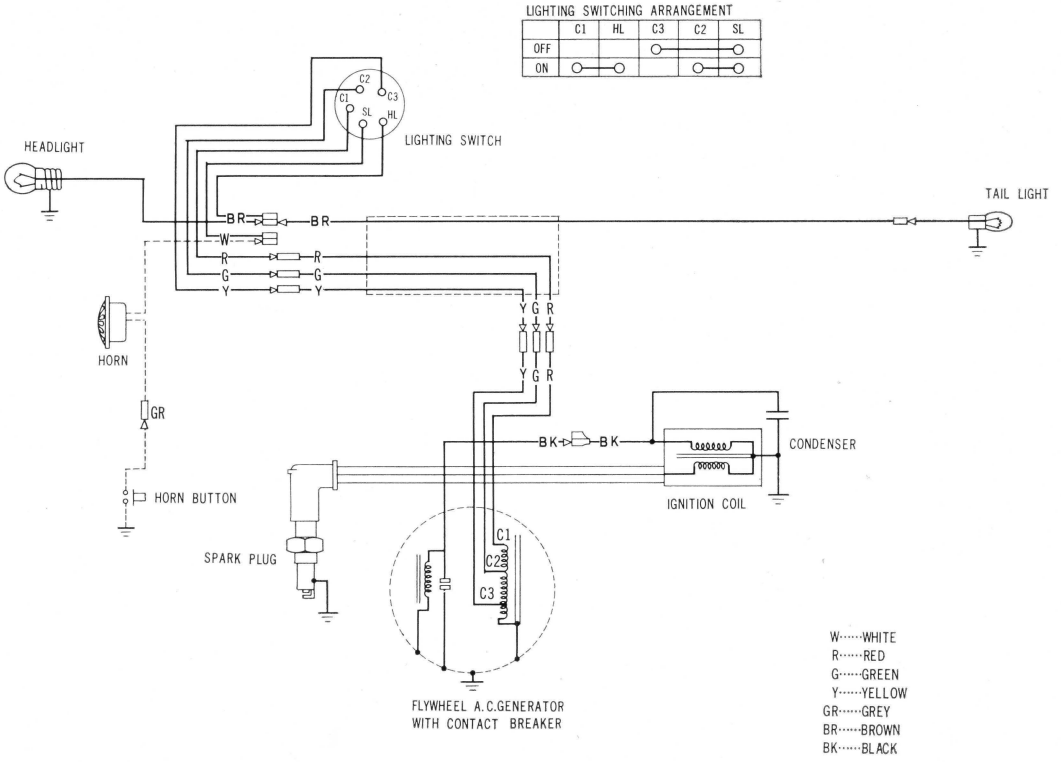
PC 50 WIRING DIAGRAM (General export type)



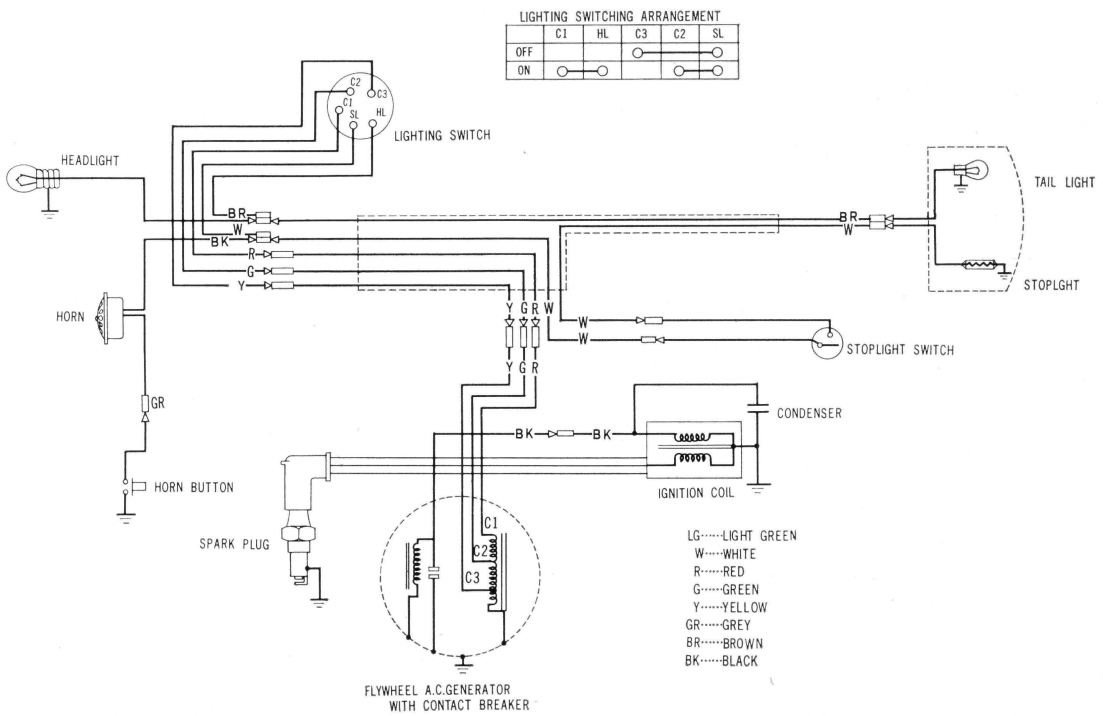
PC 50 WIRING DIAGRAM (U.K type)



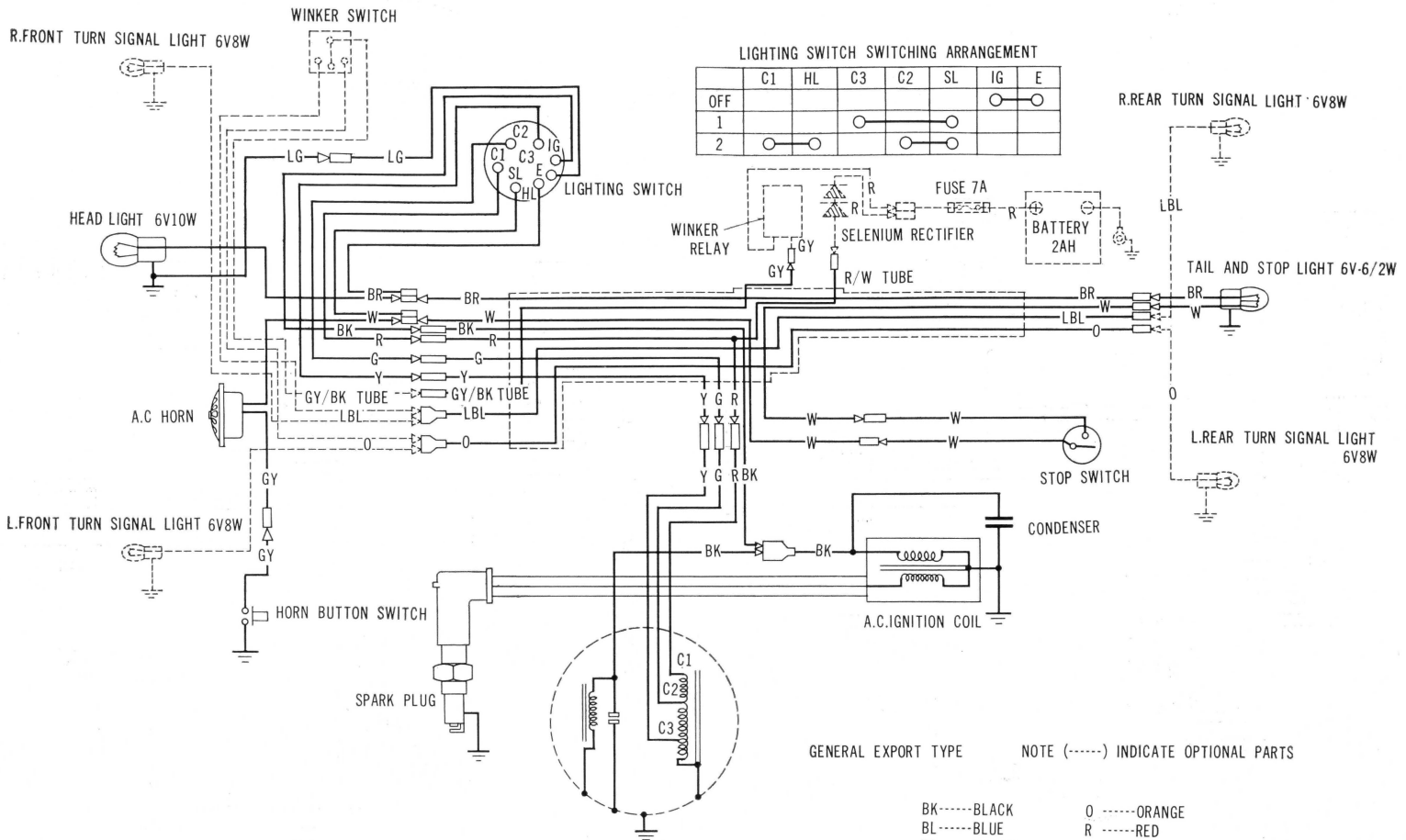
PC 50 WIRING DIAGRAM (Holland type)



PC 50 WIRING DIAGRAM (France and Belgium type)



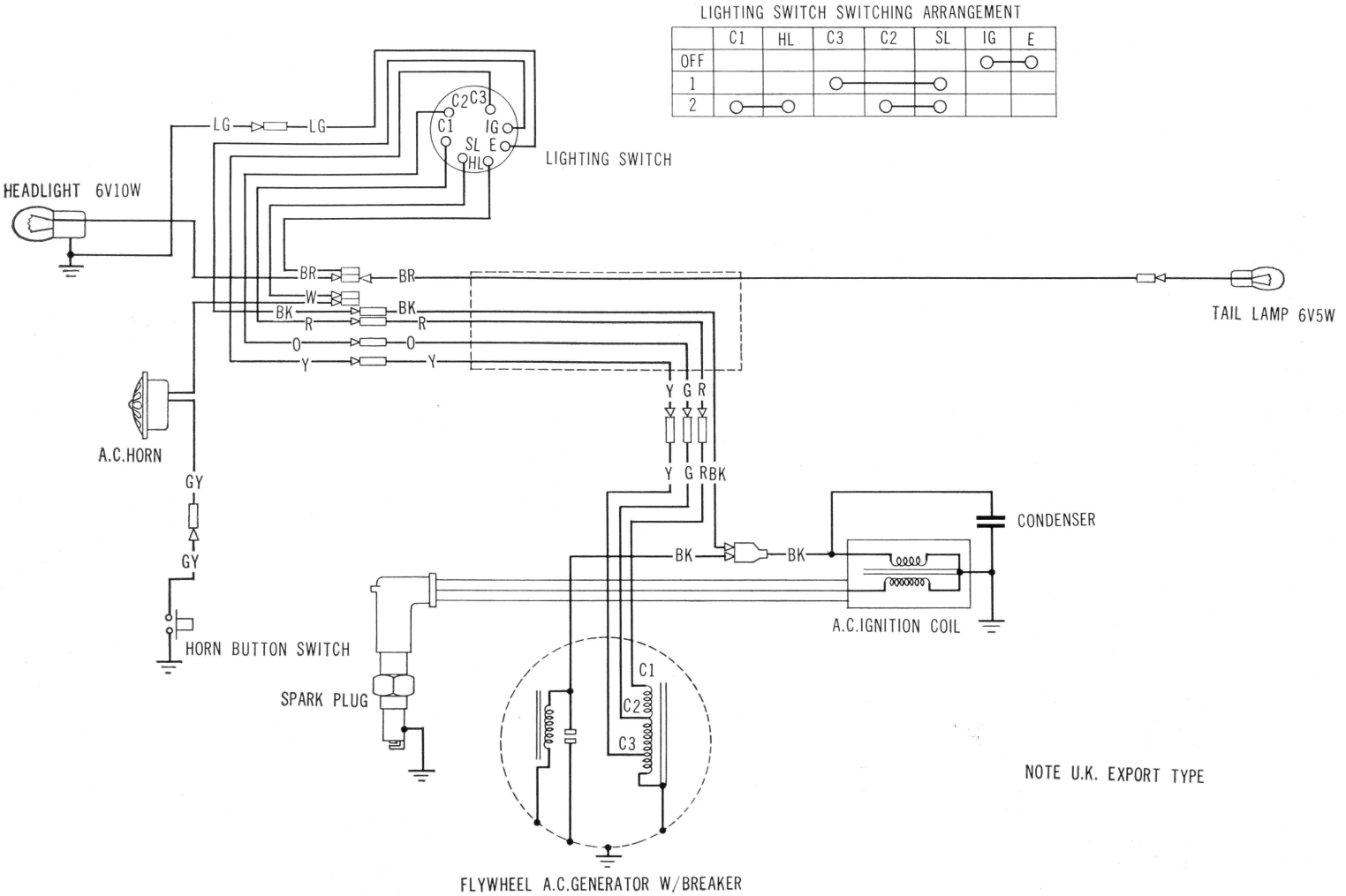
PS 50 WIRING DIAGRAM (General export type)



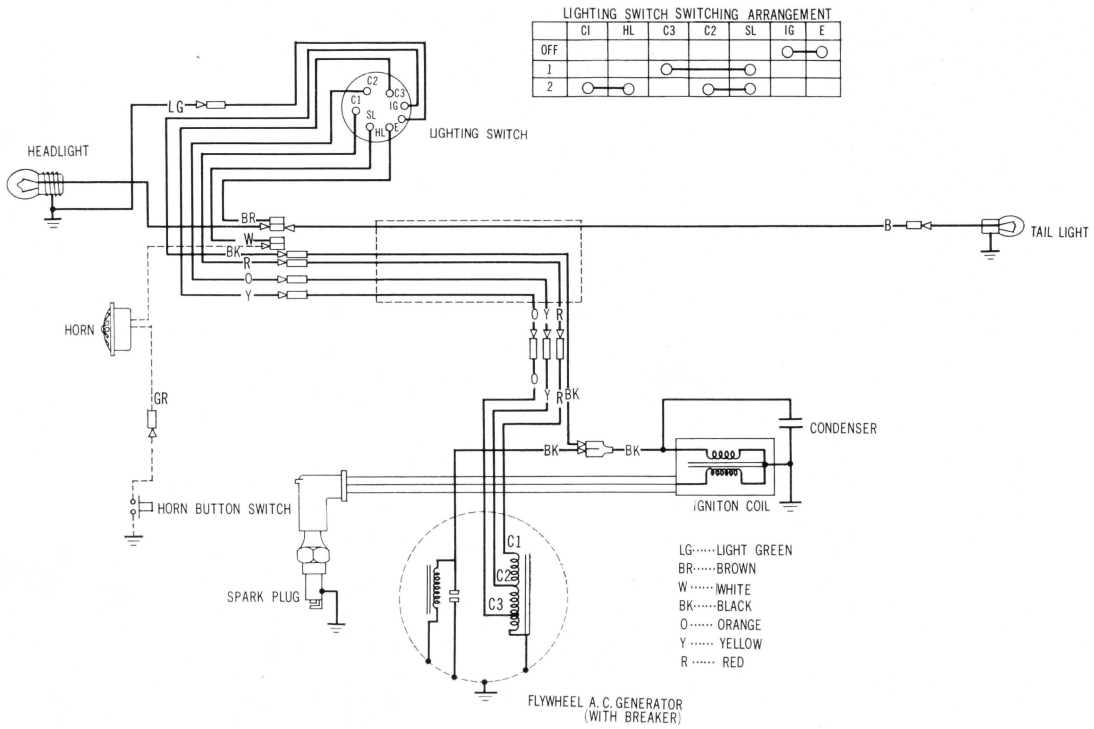
GENERAL EXPORT TYPE NOTE (------) INDICATE OPTIONAL PARTS

BK------BLACK	O ------ORANGE
BL------BLUE	R ------RED
BR------BROWN	Y ------YELLOW
G ------GREEN	W ------WHITE
GY------GRAY	GY/BK TUBE---GRAY/BLACK TUBE
LG------LIGHT GREEN	R/W TUBE ---RED/WHITE TUBE
LBL ---LIGHT BLUE	

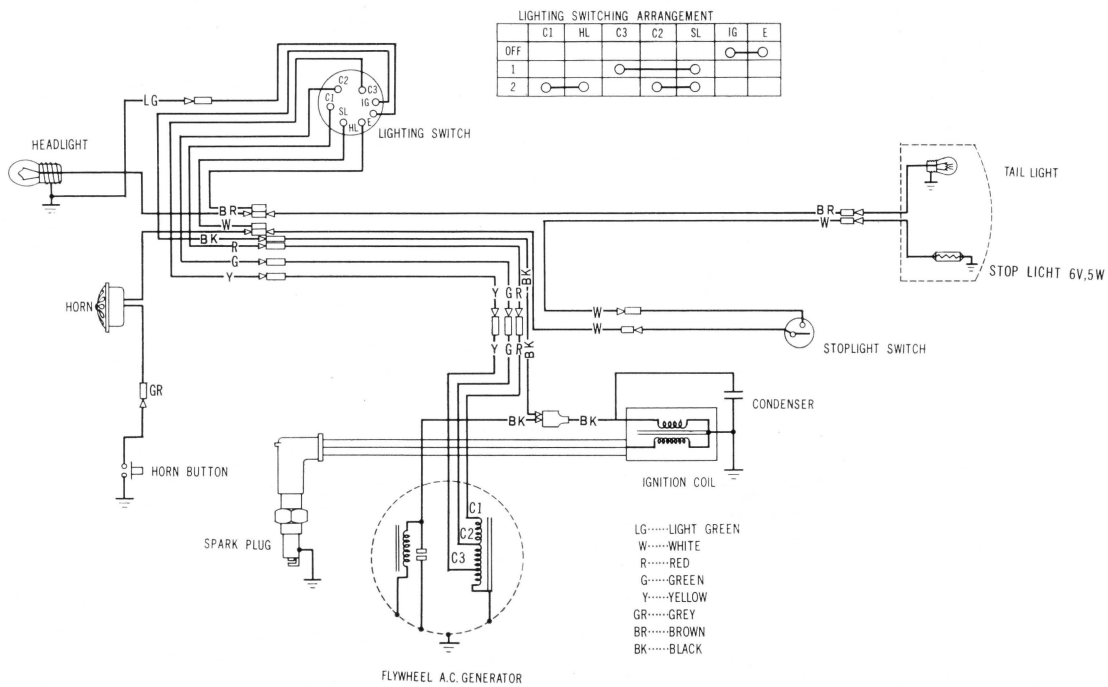
PS 50 WIRING DIAGRAM



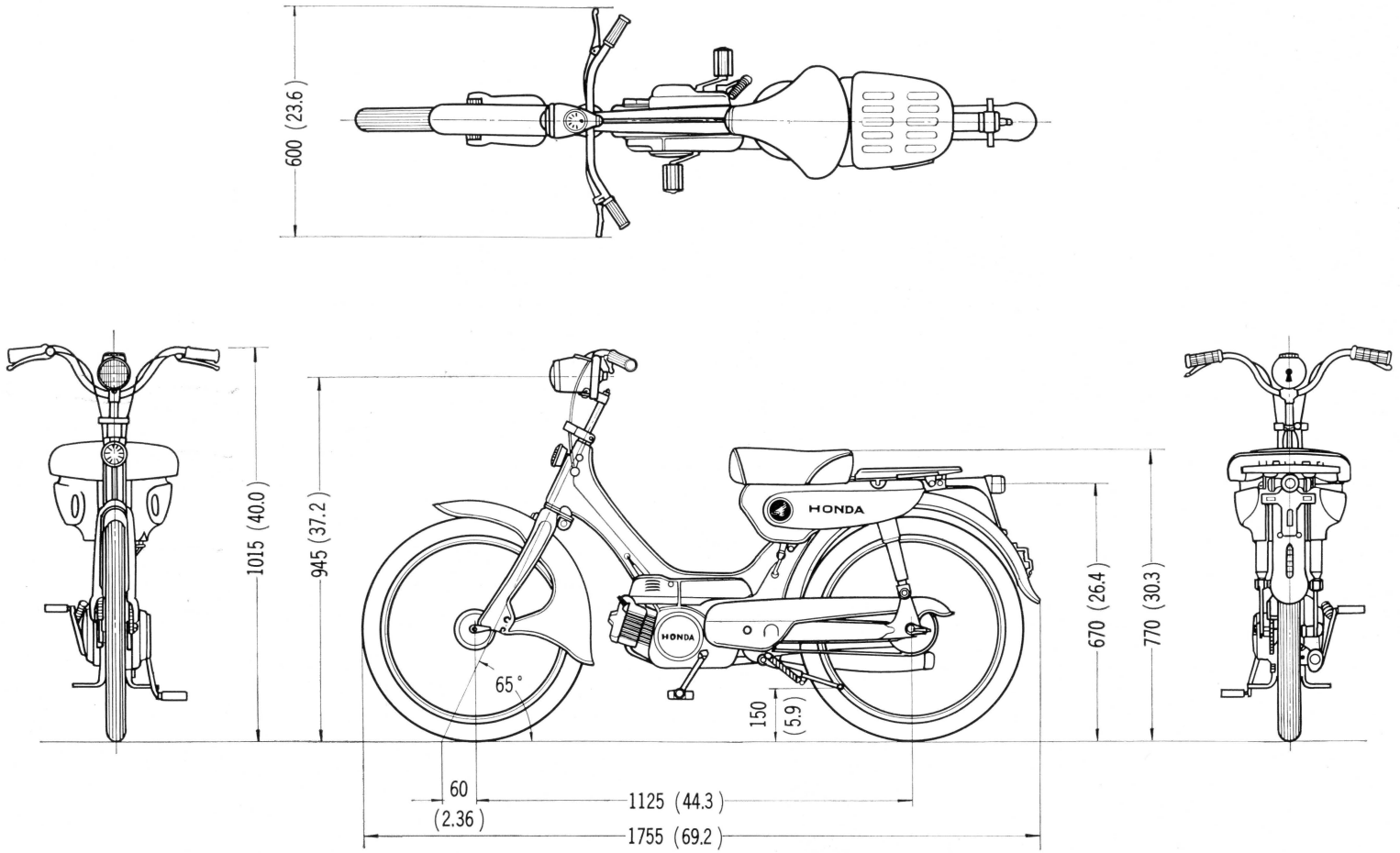
PS 50 WIRING DIAGRAM (Holland type)



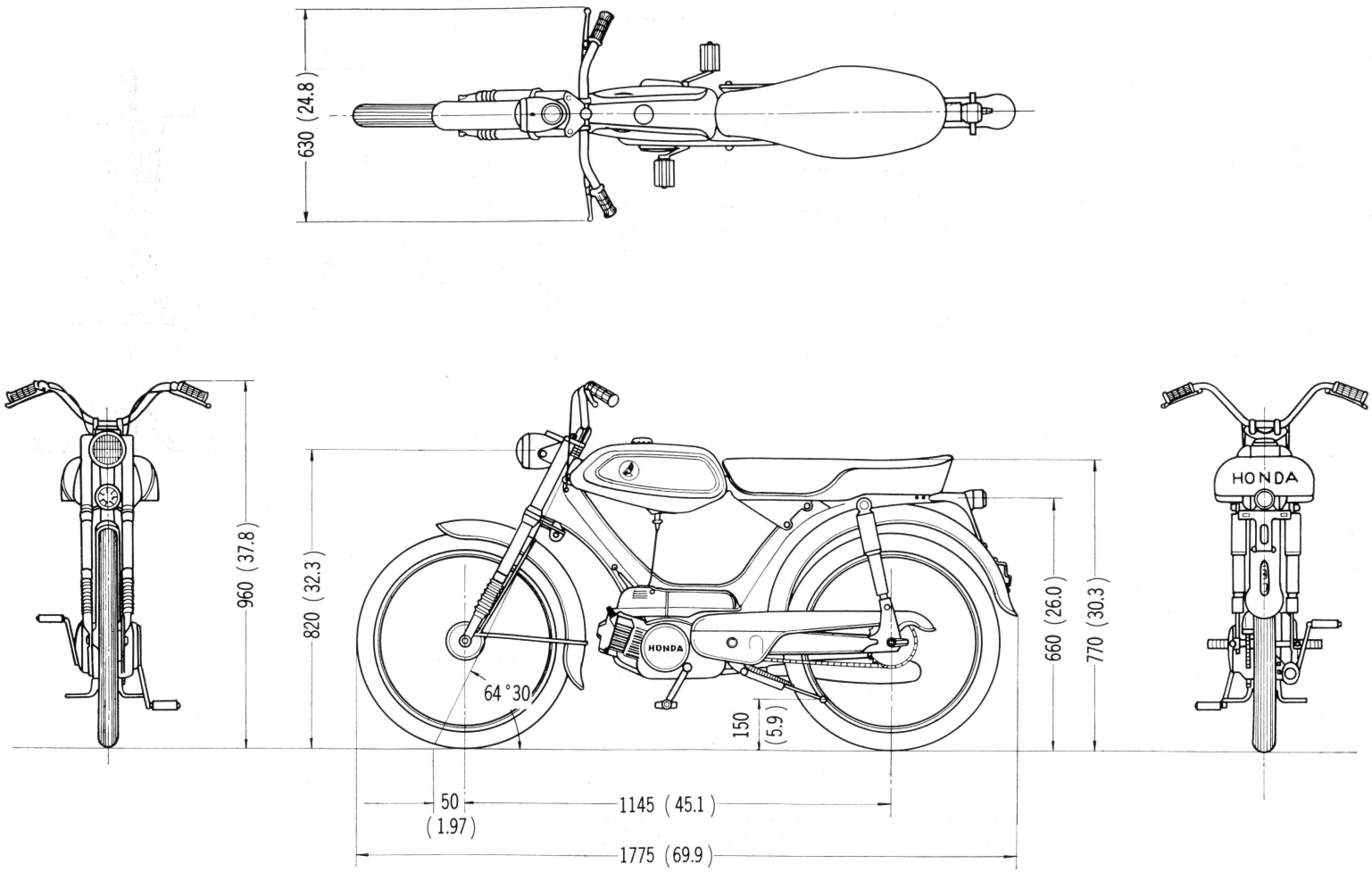
PS 50 WIRING DIAGRAM (France and Belgium type)



PC50 DIMENSIONAL DRAWING



PS50 DIMENSIONAL DRAWING



GENERAL DESCRIPTION

3. ENGINE

In the gasoline engine, the fuel and air is mixed in the proper ratio and this mixture is taken into the cylinder in a vapor condition where it is compressed and ignited, the resulting combustioh forces the piston down ward, and the combustion pressure is transformed to the rotary motion of the connecting rod.

The operation of the engine is quite similar to the pedaling of a bicycle, with power produced by pedaling considered as the combustion pressure of an air-fuel mixture, the foot acting the role of the piston, the pedal the connecting rod, and the sprocket simulating the crankshaft.

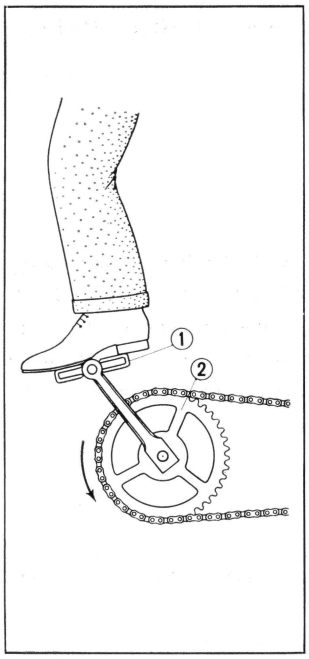


Fig. 3.1 ① Pedal ② Sprocket

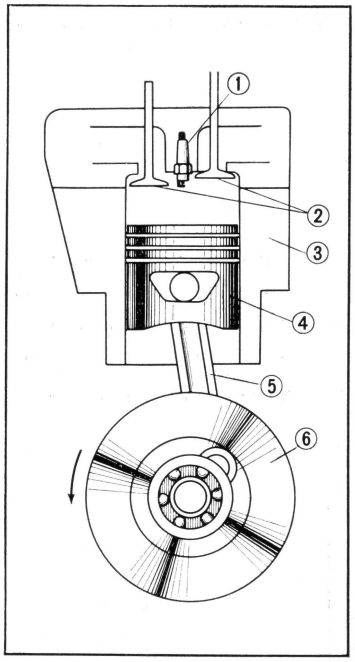


Fig. 3.2
① Spark plug ④ Piston
② Valve ⑤ Connecting rod
③ Cylinder ⑥ Crankshaft

The gasoline engine produces power at the crankshaft by the following four sequence of events, or strokes.

① **Intake** ⟶ ② **Compression** ⟶ ③ **Power** ⟶ ④ **Exhaust**

The term "cycle" is applied to one complete sequence of these four strokes. When the entire cycle of events in the cylinder requires four strokes (two crankshaft revolution), the engine is referred to as a four-cycle engine. An engine which accomlishes the entire cycle of events in two strokes (one crankshaft revolution), is referred to as a two-cycle engine. PC/PS 50 is equipped with a four-cycle engine. **(Fig. 3. 3~6)**

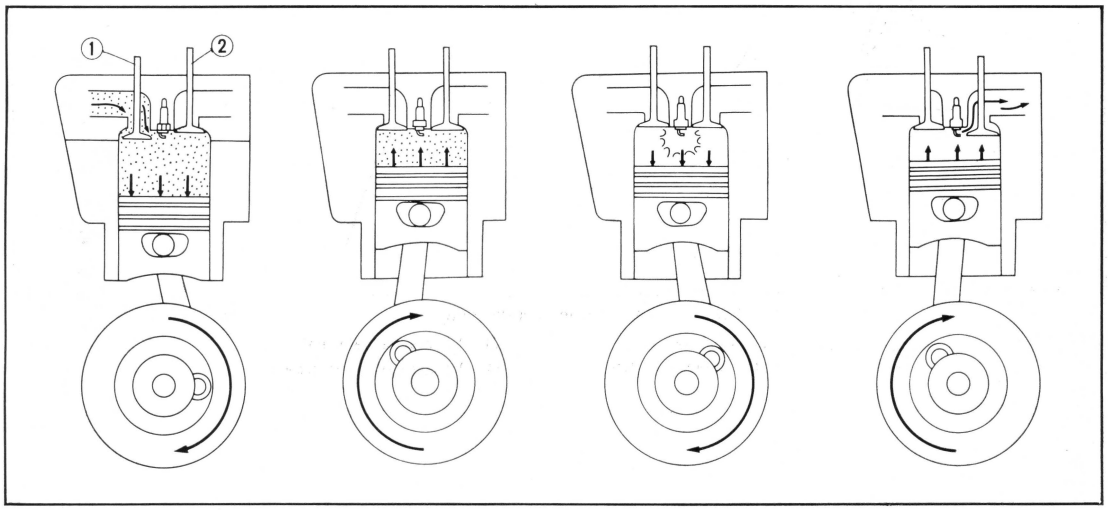


Fig. 3.3 Intake stroke
① Inlet valve
② Exhaust valve

Fig. 3.4 Compression stroke

Fig. 3.5 Combustion stroke

Fig. 3.6 Exhaust stroke

Operation of the Four-cycle Engine

The four-cycle engine requires two reciprocating sequence of the piston (two-crankshaft revolutions) to complete the intake, compression, power and exhaust strokes.

Air Cleaner

If the air that is used to mix with the fuel is dirty, a great amount of dust and grit enters the carburetor to cause troubles and they eventually pass into the cylinder to cause rapid wear to the cylinder.

The air cleaner serves to clean the air entering the carburetor.

The air cleaner removes the dust from the air and permits only the clean air to enter the carburetor through the air cleaner connecting tube. **(Fig. 3.7)**

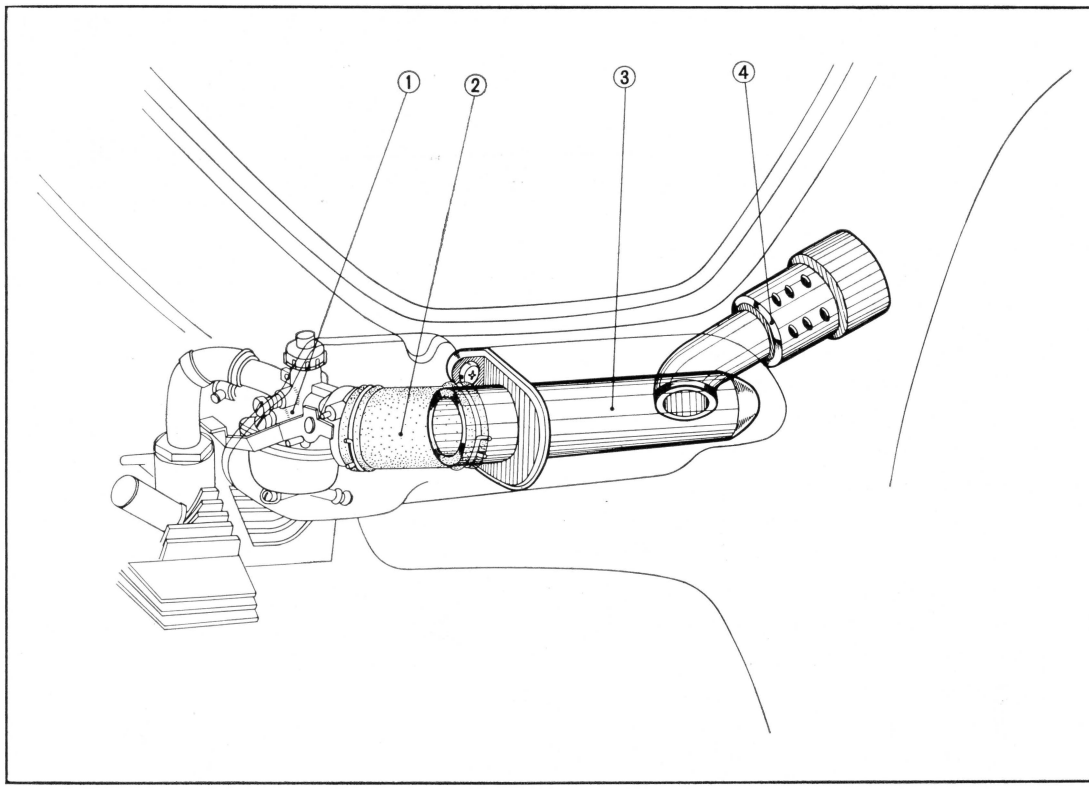


Fig. 3.7 Air cleaner construction

① Carburetor
② Connecting tube
③ Air cleaner element
④ Air cleaner inlet tube

Fuel Tank

(PC 50)

Fuel tank is mounted on the frame directory below the seat, on the left side. It has the capacity of 3 liters of fuel (0.8 U.S. gal., 0.7 Imp. gal.). The fuel cock is installed on the tank and controls the fuel which flows gravity to the carburetor. **(Fig. 3. 8 A)**

(PS 50)

The PS 50 mounts a 5.5 liters (1.5 U.S. gal., 1.2 Imp. gal.) capacity fuel tank forward of the seat. **(Fig. 3. 8 B)**

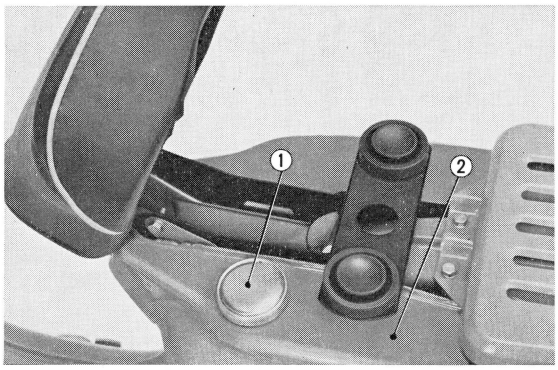


Fig. 3. 8 A
① Fuel tank cap ② Fuel tank

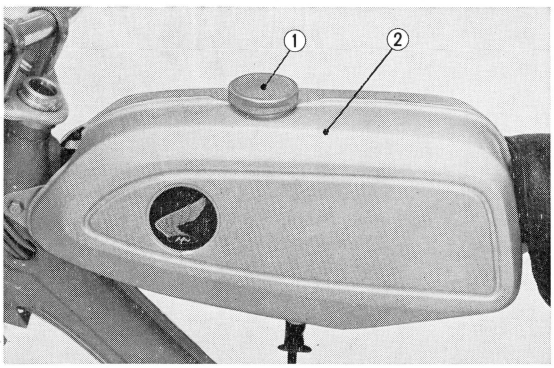


Fig. 3. 8 B
① Fuel tank cap ② Fuel tank

Carburetor

The carburetor performs the function of mixing the fuel with air in the properly proportioned mixture to form a combustible fuel air vapor.

Shown in **Fig. 3. 9** is an atomizer sprayer for home use. Air blown through the pipe A increases in velocity as the air leaves the narrow outlet, causing a decrease in pressure. The decreased pressure draws the water out of the stand pipe B which becomes atomized as it is formed into a spray.

The carburetor performs the same function, it draws in air and atomizes the gasoline.

The fuel which is delivered from the tank first enters the float chamber of the carburetor. Fuel in the float chamber is always maintained at a constant level by the action of the float which regulates the valve. If there were no means to maintain the fuel level constant, the fuel will overflow out of the float chamber or else there will be insufficient flow of fuel into the carburetor.

During the intake stroke of the engine, the inlet valve opens, piston moves downward, creating negative pressure in the cylinder. The air rushes in from the carburetor.

As air flows through the venturi, the velocity of the air increases as it moves through the narrow throat and causes a decrease in pressure, causing the gasoline to be drawn out of the nozzle as a spray and mixes with the passing air stream. The volume of air-fuel mixture that enters the cylinder is regulated by the amount of opening or closing of the throttle valve. **(Fig. 3. 10)**

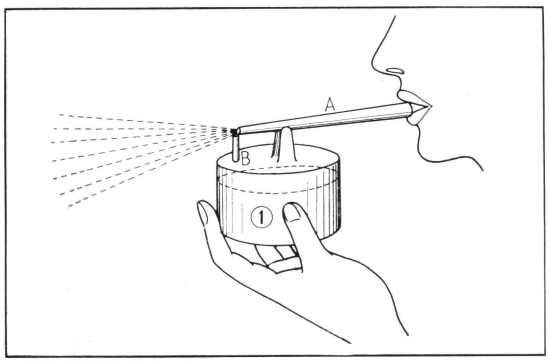


Fig. 3. 9 Sprayer
① Water

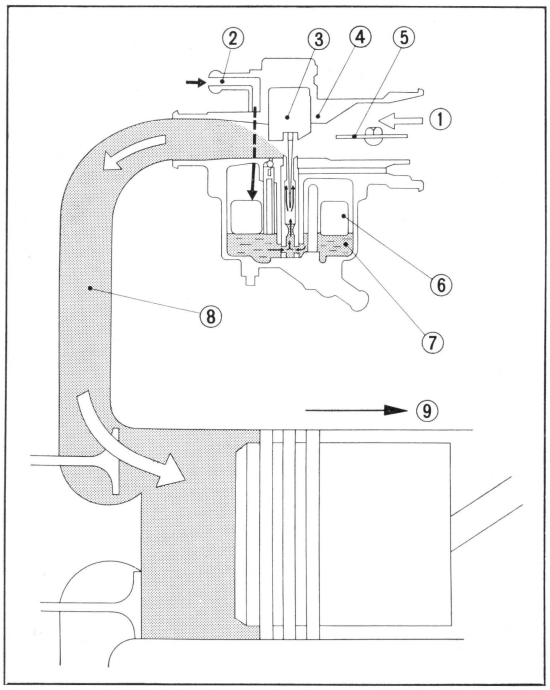


Fig. 3.10 Carburetor

① Air
② From fuel tank
③ Throttle valve
④ Venturi
⑤ Choke valve
⑥ Float
⑦ Float chamber
⑧ Fuel-air mixture
⑨ Intake stroke

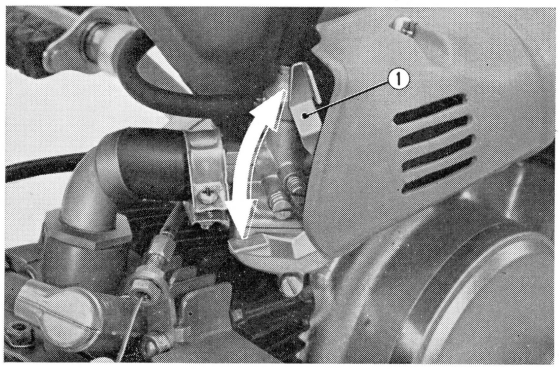


Fig. 3.12

① Choke lever

The choke valve is used to permit the carburetor to supply the engine with the rich mixture required for starting during cold weather. The choke lever is located on the left side of the carburetor. **(Fig. 3.12)**

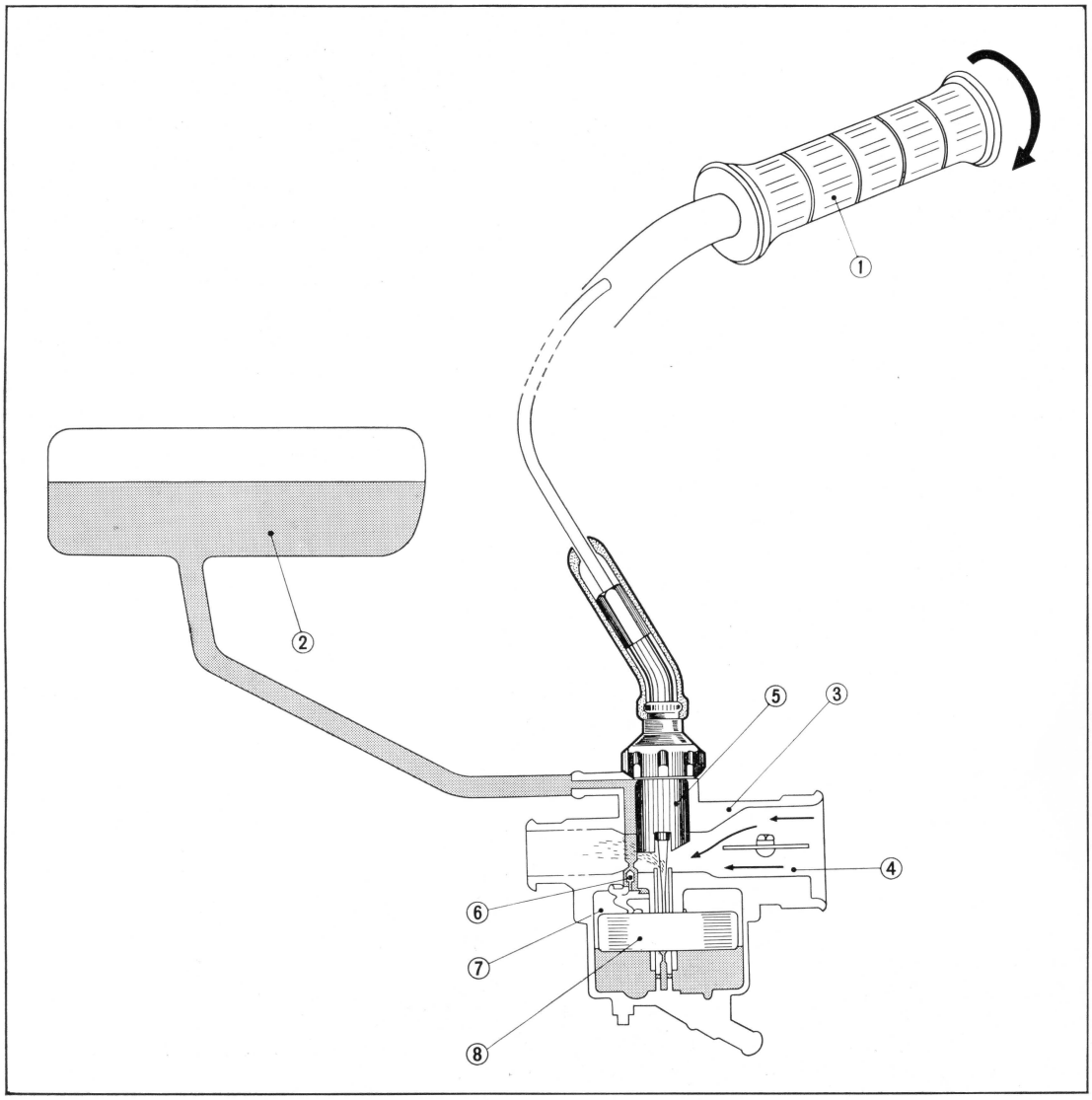


Fig. 3.11 Operation of throttle valve

① Throttle grip ③ Carburetor ⑤ Throttle valve ⑦ Float chamber
② Fuel ④ Air ⑥ Float valve ⑧ Float

Throttle Valve

The throttle valve regulates the amount of air-fuel mixture to enter the cylinder. The opening or closing of the throttle valve is controlled by the throttle grip through the use of the throttle cable. Turning the throttle grip inward raises the throttle valve to increase the diameter of air passage in the carburetor as well as the opening of the needle jet so that the amount of fuel to be discharged is regulated, maintaining the air-fuel mixture ratio constant at all times. **(Fig. 3.11, 13 and 14)**

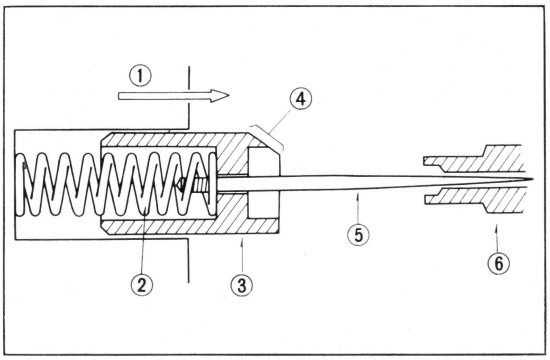


Fig. 3.13 Throttle valve

① Close ④ Cutaway
② Throttle valve spring ⑤ Jet needle
③ Throttle valve ⑥ Needle jet

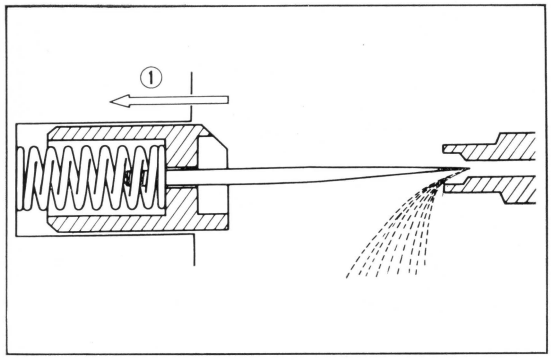


Fig. 3.14 Throttle valve
① Open

Mixture Ratio

The amount of fuel mixed with the air is called "mixture ratio", a weight ratio. The typical ratio is a mixture of 1 pound of fuel to 15 pounds of air. This is normal for riding at a constant speed on a level road. Actually, the mixture ratio will vary with the engine operating conditions such as :

- The leanest combustible mixture ratio →22 : 1
- The leanest operating mixture ratio →18 : 1
- **The mixture ratio for complete combustion →15 : 1**
- **The mixture to obtain maximum power →13 : 1**
- The richest operating mixture ratio → 8 : 1
- The richest combustible mixture ratio →7.5 : 1

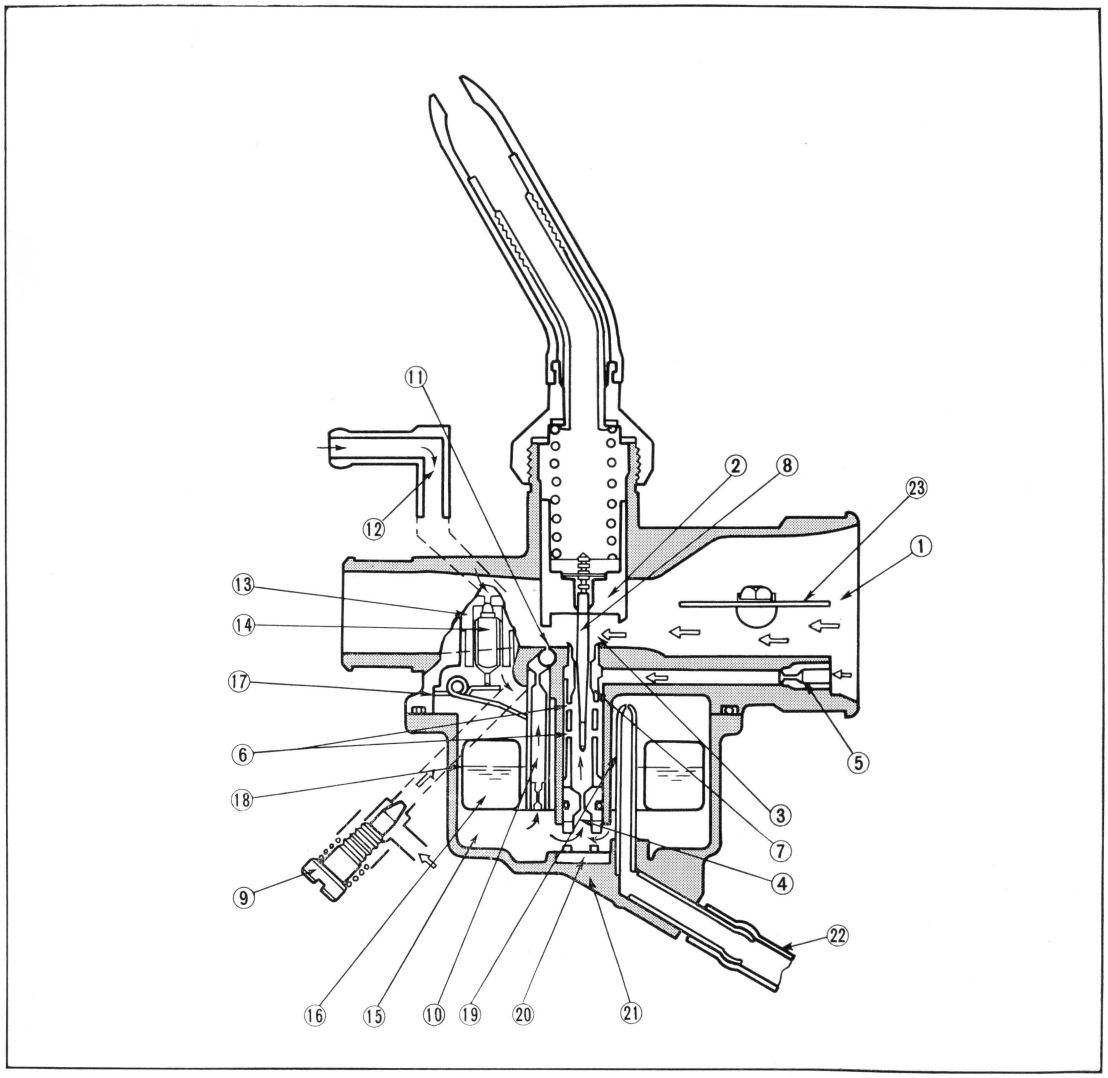


Fig. 3.15 ① Inlet opening ② Throttle valve ③ Venturi ④ Main jet ⑤ Air jet ⑥ Air bleed ⑦ Needle jet ⑧ Jet needle ⑨ Air screw ⑩ Pilot jet ⑪ Pilot outlet ⑫ Fuel passage ⑬ Valve seat ⑭ Float valve ⑮ Float chamber ⑯ Float ⑰ Float arm ⑱ Fuel level ⑲ Overflow pipe ⑳ Packing ㉑ Float chamber body ㉒ Vinyl pipe ㉓ Choke valve

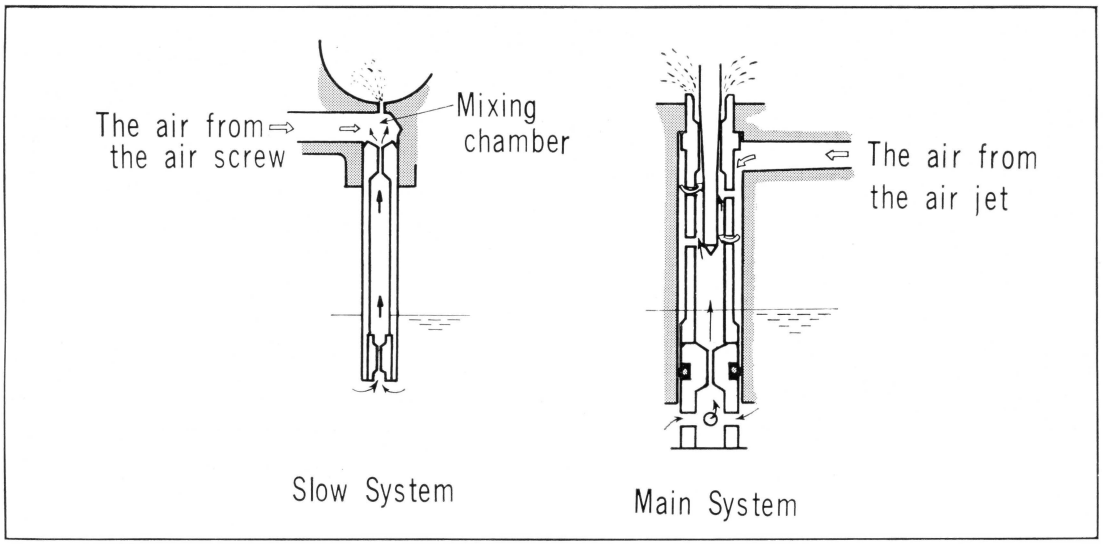


Fig. 3.16

Air System

The carburetor used is a side draft piston valve.

As shown in the **Fig. 3.15**, the air from the air cleaner enters the inlet opening ①, passes by the throttle valve ② and is drawn into the engine after passing through the venturi ③.

The engine power output is determined by the volume of air flow which is controlled by the movement of the throttle valve ② to vary the opening of the venturi.

Fuel System

The air flow passing through the venturi ③ produces negative pressure at the restriction under the throttle valve ②, where the fuel nozzle is located. There are two systems, the main and the slow system, in the fuel system.

a. Main System

The fuel enters the main jet ④ ; where, it mixes with the air from the air bleed ⑥, after the air drawn from the inlet opening has been metered by the air jet ⑤. The fuel and air mixture passes through the opening between the needle jet and jet needle to be discharged as a spray at the throttle valve. The fuel spray mixes with the main incoming air and becomes atomized before being taken into the engine.

b. Slow System

The air which enters the inlet opening passes through the air screw where it is metered. On the other hand, the fuel from the float chamber after being metered by the two stage tapered pilot jet, mixes with the air which had been metered by the air screw at the junction area and discharges the fuel mixture from the pilot outlet at the bottom of the throttle. This mixes with the main flow of air from the inlet opening and is taken into the engine.

Float Chamber

It is necessary for the carburetor to supply the proper fuel mixture to the engine under all different throttle opening and engine speed ; in order to do this, the fuel level must be maintained at a constant level. It is the function of the float chamber to perform this task.

The fuel from the tank flows through the passage ⑫, passes between the valve seat ⑬ and the float valve ⑭, and then enters the float chamber ⑮. As the fuel level in the float chamber rises, the float ⑯ becomes buoyant, float arm ⑰ applies pressure against the float valve forcing it against the valve seat to shut off the flow of the fuel. When the fuel in the float chamber is consumed, the fuel level drops with the consequent lowering of the float, this causes the float valve to unseat and permits the fuel to enter the float chamber. This cycle is repeated to maintain a constant fuel level ⑱ in the float chamber.

Overflow Pipe

When dirt becomes clogged in the float valve, fuel overflows from the needle jet and the pilot outlet, overflowing into the cylinder to lubricating oil. Therefore, to prevent a condition where the fuel rises above a certain level, an overflow pipe ⑲ is inserted in the float chamber to drain any excess fuel. The location of the overflow pipe is such that only the fuel rising above the overflow opening is drained out.

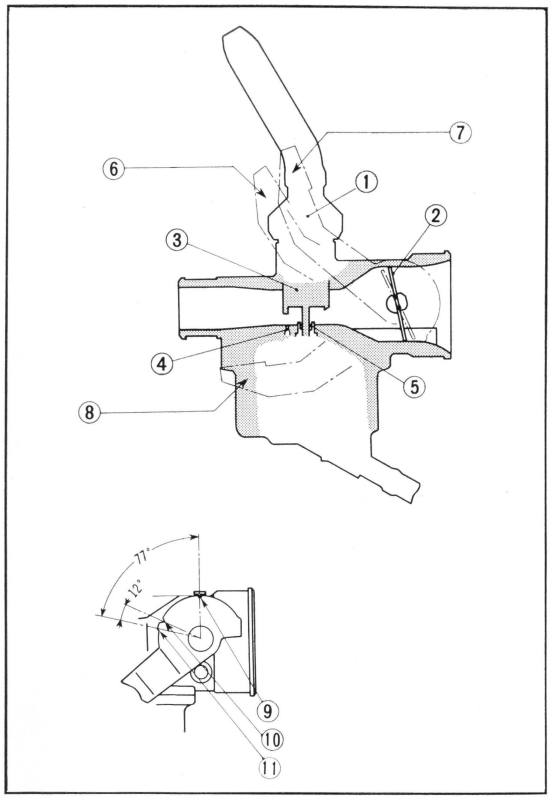


Fig. 3.17

① Chake lever
② Choke valve
③ Throttle valve
④ Pilot outlet
⑤ Needle jet
⑥ Choke lever intermediate position
⑦ Choke lever full close position
⑧ Choke lever full open position
⑨ Full open notch : Normal operation after warm-up
⑩ Intermediate notch : Set to this position during warm-up
⑪ Full close notch : Set to this position for starting

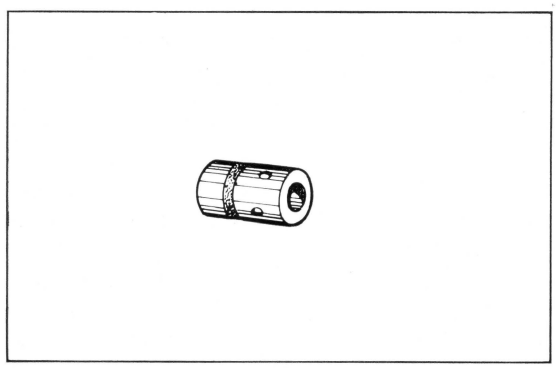


Fig. 3.18 Main jet

Choke

During cold weather starting, it may be necessary to initially use a rich fuel mixture. For this purpose, a choke valve is incorporated. When the lever is rised, the choke valve is closed fully. When the throttle valve is opened approximately 1/4, and the engine cranked by pedal, a negative pressuredraws the fuel out of the pilot outlet and the needle jet, for starting. However, under this condition the fuel mixture is too rich and the engine will stall before warm-up can be achieved.

Therefore, after the engine starts, the coke lever must be returned the intermediate position (approximately 12°) marked on the lever so that proper fuel mixture will be provided the cold engine until it can be warmed-up.

The choke lever in the intermediate position will simplify the warm-up operation, and after which time, the choke valve may be fully opened. Engine is warmed-up when the throttle can be suddenly opened and a smooth response can be obtained without the engine logging or resulting in fuel starvation. **(Fig. 3.17)**

Operation of PC/PS 50 Carburetor Component Parts

Main jet

It meters the fuel flow during full throttle condition (top speed) to provide a proper fuel mixture. Not only does it function at top speed but it also is effective to a certain degree at intermediate speed. The larger the main jet size number, greater will be the nozzle opening and consequently the fuel flow, providing a richer fuel mixture. **(Fig. 3.18)**

Air Jet

During full throttle opening, the fuel mixture at high engine speed will become rich, and at slow speed the mixture becomes lean. To prevent such a condition, air is bled into main jet to maintain a uniform mixture. The function of the air jet is to control the amount of the bleed air.

As the air jet becomes larger, the amount of bleed air is increased, resulting in a lean fuel mixture, however, at a set throttle opening, a high engine speed will produce a leaner mixture. There is only a small variation in fuel consumption between high and low engine speed.

Needle Jet

During full or half throttle opening, the fuel which had been metered by the main jet is again metered by the needle jet. The adjustment is performed in conjunction with the jet needle which is explained in the following section. The needle jet opening is made exceptionally accurate for precise control. **(Fig. 3. 19)**

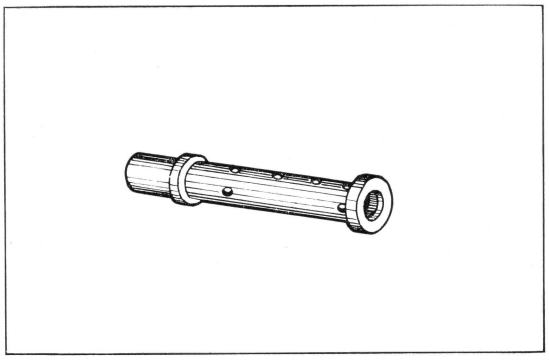


Fig. 3. 19 Needle jet

Jet Needle

The jet needle, in conjunction with the needle jet described earlier, regulates the fuel mixture at the intermediate throttle opening (principally between 1/4 to 3/4 throttle opening). The long tapered jet needle is located within the center hole of the throttle valve with the tapered end inserted into the needle jet. The vertical movement of the throttle valve to which the jet needle is attached controls the flow of the fuel in respect to the throttle opening to afford a correct fuel mixture ratio.

There are five clip grooves (which are counted from the top) on the head of the jet needle to regulate the richness of the fuel mixture.

The fuel mixture becomes richer as the clip is moved progressively from the No. 1 groove to the No. 5 groove. **(Fig. 3. 20)**

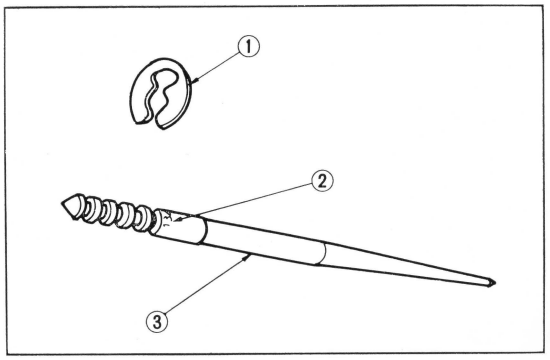


Fig. 3. 20 Jet needle
① Needle clip
② Type mark
③ Jet needle

Throttle Valve

The function of the throttle valve is to control the amount of air taken into the engine ; this determines the engine speed, the power output, and in addition, performs the important function of controlling the fuel air mixture.

The throttle valve has a cut-away on the air inlet side.

Changing the size of the cut-away (designed by cut-away No.), the pressure actuating the needle valve can be altered to change the amount of fuel flow and causes a change to the fuel mixture. The valve with a larger cut-away number will produce a leaner fuel mixture. However, the range of its effectiveness is mainly at low speed, from idling speed to approximately 1/4 throttle opening and has no effect above 1/2 throttle opening.

A throttle stop screw sets the throttle valve in the idle position. Screwing in on the stop screw will cause the throttle valve to rise, and backing off will lower the throttle valve.

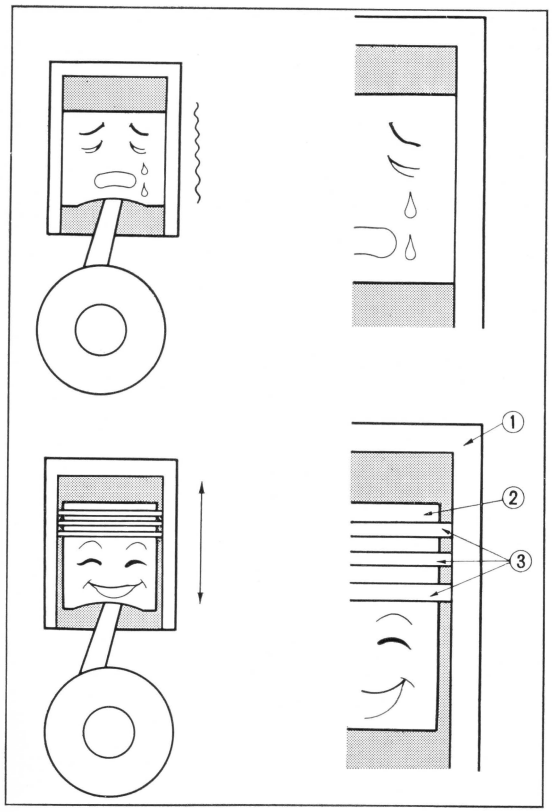


Fig. 3. 21 Piston
① Cylinder
② Piston
③ Piston rings

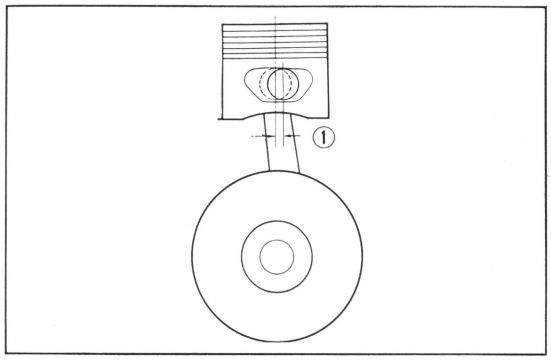


Fig. 3. 22 ① Offset

Pilot jet

The pilot jet controls the fuel flow in two stages during idling and slow speed.

The jet is numbered similar to the main jet so that the larger number will provide greater fuel flow and richer fuel mixture.

Packing

Main jet and needle jet are held against the float chamber body by the resilience of the rubber packing.

COMPRESSION
(Compress the fuel air mixture in the cylinder)

Piston

The piston plays an important role by performing the intake, compression, power and exhaust functions. It is alternately cooled by the intake fuel-air mixture or exposed to the hot gases resulting from the combustion. If the piston is closely fitted against the cylinder wall without clearance as shown in the **Fig. 3. 21**, it would not operate smoothly and may result in seizure.

On the other hand, excessive clearance between the piston and cylinder wall will result in insufficient intake of fuel-air mixture, causing low compression, oil pumping (oil enters the combustion chamber), etc., and consequence poor engine performance. Therefore, a good seal must be maintained between the piston and cylinder wall. For this purpose, piston rings are installed to provide the necessary seal.

The piston is made of aluminum die casting equivalent to SAE 8630. This material is light and has good heat conducting property so that the heat from the combustion can be dissipate rapidly. Furthermore, this material has a small coefficient of expansion, thus minimizing the expansion of the piston at elevated temperature and permits a small piston to cylinder clearance design.

Piston Offset

As shown in the **Fig. 3. 22**, the piston pin is offset slightly from the piston centerline. This is to reduce the side load against the cylinder wall and by so doing prevent piston slap. **(Fig. 3. 22)**

Piston Shape

The shape of the piston is an elliptical taper. This is because the head of the piston, compared to the skirt, is exposed to much higher temperature and since the expansion is greater, it is tapered smaller toward the top. The tapering of the piston also tends to lessen the piston slap when the throttle is lightly snapped at light engine loading at at low speed. **(Fig. 3. 23)**

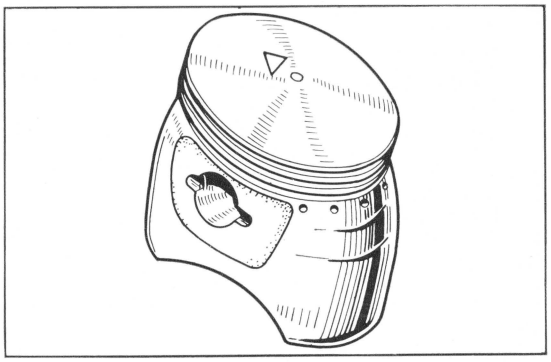


Fig. 3. 23 Piston configuration

Piston Rings

Usually three piston rings are installed on the piston. Starting with the top, they are called the top ring, second ring and oil ring.

The top and second rings :

Serve as a seal for the combustion chamber and also to transmit the high temperature of the piston to the cylinder wall where it is dissipated through the cylinder cooling fins.

The oil ring :

Serves to scrape off excessive amount of oil from the cylinder wall and to prevent oil from entering the combustion chamber.

To prevent flutter, the rings are made narrower in width and increased in thickness so that the inertia is decreased while the ring pressure against the cylinder wall is increased. Further the top and the second rings are made at a slight taper where it contact the cylinder wall so that the time required for swear-in is lessened.

The groove in the oil ring as well as the bevel of the second ring serves to assist oil scraping and prevents oil from penetrating into the combustion chamber.

Thus, carbon deposit on the plug, piston rings, etc. is prevented and the oil consumption kept to a minimum. **(Fig. 3. 24)**

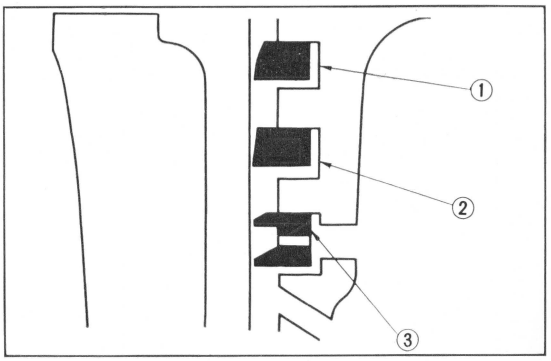


Fig. 3. 24 Piston ring
① Top ring
② Second ring
③ Oil ring

Piston Ring Flutter

At low speed, the piston ring is forced against the upper side of the ring groove only during the intake stroke. At high speed, however, the inertia of the ring overcomes the gas pressure and friction, and floats to the top of the groove immediately before the top-dead-center in the compression stroke. At this moment, combustion occurs and the ring is forced against the bottom side of the ring groove by the combustion pressure. This up and down movement during exhaust-intake-compression becomes more and more intense coupled with the increasing

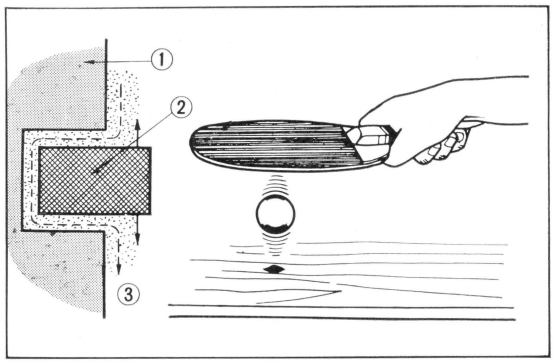


Fig. 3. 25 ① Piston ② Piston ring ③ Blow-by

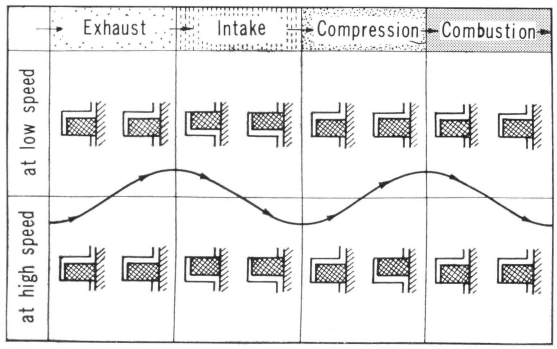


Fig. 3. 26

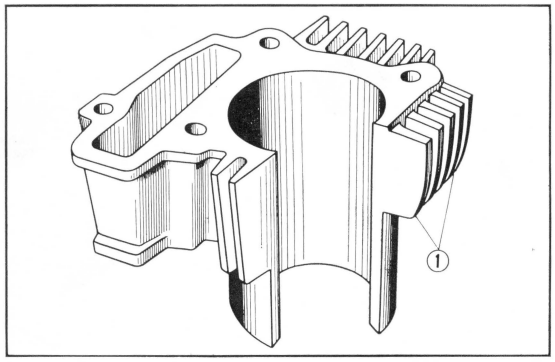


Fig. 3. 27 Cylinder
① Cooling fins

inertial force. As this sequence is repeated, ultimately, the ring vibrates violently within the ring groove like a pingpong ball between the racket and the table as shown in the **Fig. 25** and thus, allow the gas to "blow-by". **(Fig. 3. 25, 26)**

Cylinder

The piston cannot operate without the cylinder.

The cylinder wall is exposed to high temperature and pressure together with the wearing action of the reciprocating piston moving at high speed to produce a great wearing effect. Therefore, adequate attention must be given to the material and construction of the cylinder as well as the piston. The cylinder has many cooling fins on the outside so as to increase the heat dissipating area and prevent the cylinder and piston from overheating.

COMBUSTION

(Ignition of the compressed air-fuel mixture by the spark plug to cause combustion)

When the piston reaches the top-dead-center at the end of the compression stroke, the compressed air-fuel mixture must be ignited.

Ignition System

Magneto system

a. Flywheel magneto (rotating permanent magnet)

b. Box magneto

PC/PS 50 incorporates a flywheel magnet (flyweel AC generator).

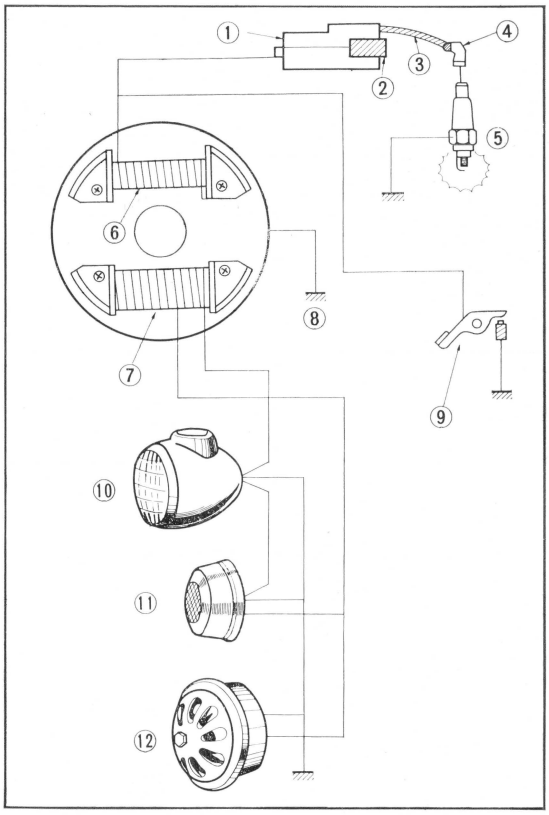


Fig. 3.28 Flywheel AC generator

① Ignition coil	⑦ Lighting coil
② Condenser	⑧ Ground
③ Hightension cord	⑨ Contact breaker
④ Spark plug cap	⑩ Head light
⑤ Spark plug	⑪ Tail/stop light
⑥ Primary coil	⑫ Horn

Flywheel AC Generator

By rotating the flywheel (permanent magnet), electrical current is generated at the stationery primary coil. The primary current of this voltage is interrupted by the contact breaker to produce a high tension voltage from the ignition coil.

Ignition Coil

The ignition coil is composed of a primary coil having approximately 300 turns of 0.44 mm (0.017 in) diameter enamel or polyester coated copper wire and a secondary coil having 20,000 turns of 0.06～0.07 mm (0.0024～0.0028 in) diameter enamel or polyester coated copper wire wound around an iron core.

Essentially, it is a transformer to change the 6～12 V primary voltage. The change in the magnetic flux due to the sudden opening and closing of the contact breaker points in utilized to generate high voltage.

The ignition coil is located in the frame where it is not restricted as in case of being installed in the flywheel and where it is not directed by the heat of the engine. Further it is accorded adequate cooling.

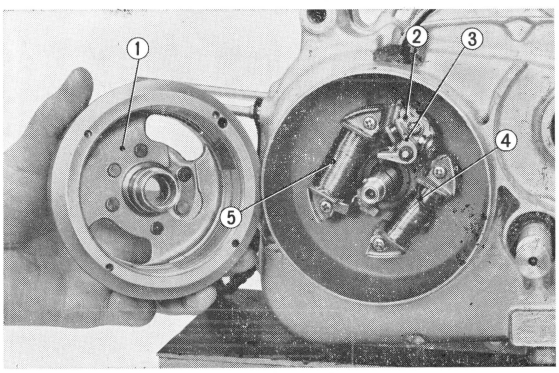


Fig. 3.29 Flywheel AC generator

① Flywheel	④ Primary coil
② Groove	⑤ Lighting coil
③ Contact breaker	

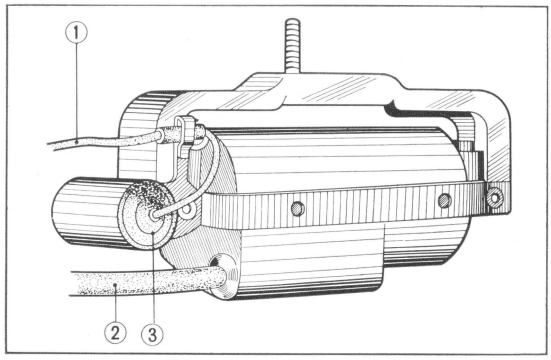


Fig. 3. 30 Ignition coil
① Primary wire ③ Condenser
② High tension cord

The ignition coil is made durable and of heat resistant material. This greatly assists in prolonging the service life of the breaker points. **(Fig. 3. 30)**

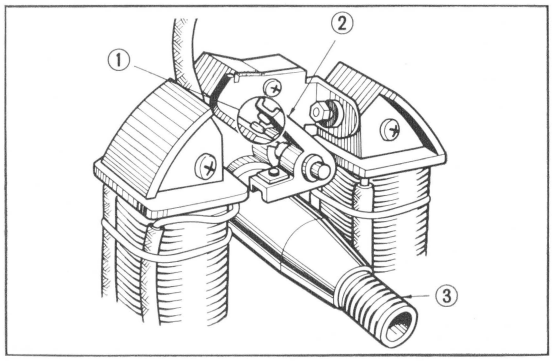


Fig. 3. 31 Contact breaker point
① Breaker point ③ Crankshaft
② Breaker arm

Breaker Points

The breaker points interrupt the primary circuit of the ignition coil. Points are kept closed by force of the spring and opened by the breaker point cam incorporated in the hub of the flywheel to interrupt the primary circuit.

At this moment, induction, occurs at the primay coil and the high voltage is induced in the seondary coil in proportion to the number of windings in the coil.

Condenser

In a household electrical circuit, if the circuit breaker is opened, sparks will be noticed across the points. Similarly, when the breaker points are opened, sparks are produced in most cases. This prevents the sudden collapes of the primary circuit and thereby reduces the high voltage required for the secondary coil and further causes sparking across the point which eventually results in burning or pitting of the breaker points. The condenser is installed in parallel across the breaker points to prevent this undesirable condition.

Condenser can be considered as a device to store electricity. It is made from sheets of mica or paraffin paper and tin foil in alternate layer. **(Fig. 3. 32)**

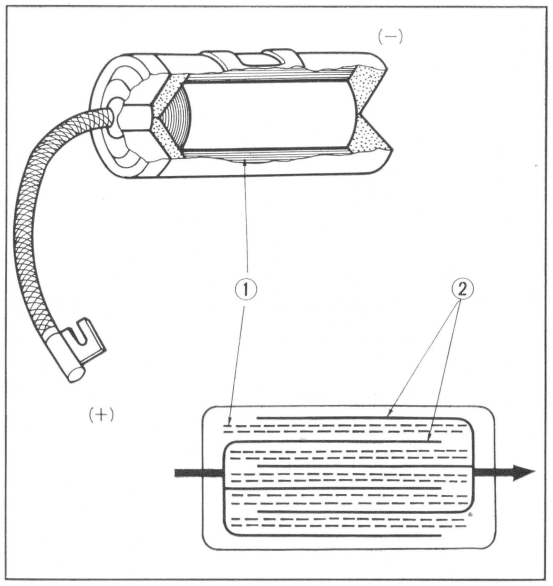


Fig. 3. 32 Construction of condenser
① Mica ② Tin foil

Spark Plug

The spark plug plays the role of igniting the compressed air-fuel mixture within the cylinder. The spark plug is securely screwed into the cylinder head with a gasket installed. It is exposed to high voltage, high compression and high temperature ; hence, high strength, heat resistance and reliability are essential.

At the end of the plug are located the center electrode and the grounded side electrode with clearance of **0.6～0.7 mm (0.024～0.028 in)** between the electrodes.

In the spark plug clearance or gap is too wide, resistance to the high voltage to bridge the gap is increased and prevents the spark from being produced ; if the plug gap is too narrow, a short is likely to occur due to carbon deposits, and in which case, a misfire will result. Therefore, the plug gap should be maintained at the specified clearance and the electrode surfaces always be kept clean. The high voltage produced by the ignition coil is received by the spark plug and causes a hot spark to jump across from the center electrode to the side electrode and ignites the combustible mixture within the engine combustion chamber.

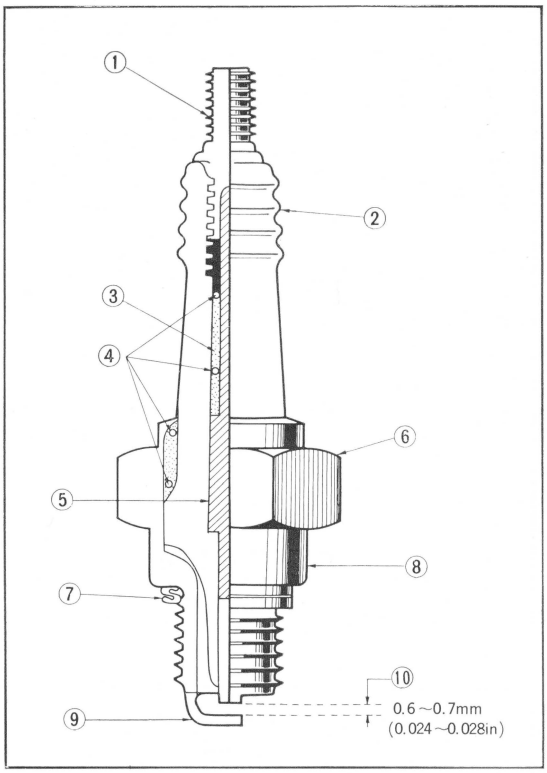


Fig. 3. 33 Construction of spark plug

① Terminal
② Insulator
③ Filler powder
④ Wire packing
⑤ Center electrode
⑥ Wrenching surface (hex)
⑦ Gasket
⑧ Main body
⑨ Electrode
⑩ Spark gap

Noise Suppressor

Oscillating current which includes high frequency wave generated in the high tension ignition circuit radiates from the high voltage circuit and the frame body and causes interference (by causing noise, distortion to image) to the television set, radio, etc. To prevent this, a noise suppressor is installed. It incorporates a carbon resistor, as shown in **Fig. 3. 34**, within a sealed case. The carbon resistor functions as an attention resistor and the sealed case serves to help prevent high frequency radiation in conjunction with the carbon resistor. **(Fig. 3. 34)**

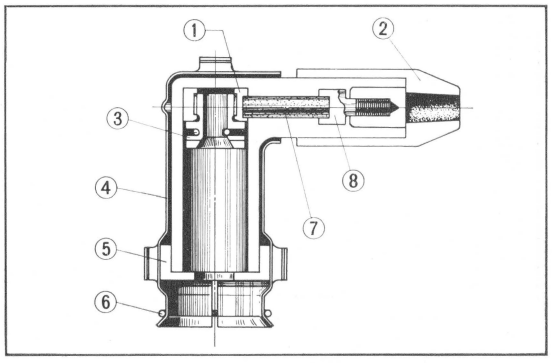


Fig. 3. 34 Sectional view of noise suppressor

① High tension terminal bushing
② Terminal water proof cap
③ High tension terminal cap
④ Shield case
⑤ High tension terminal seal
⑥ Earth band
⑦ Carbon resistant

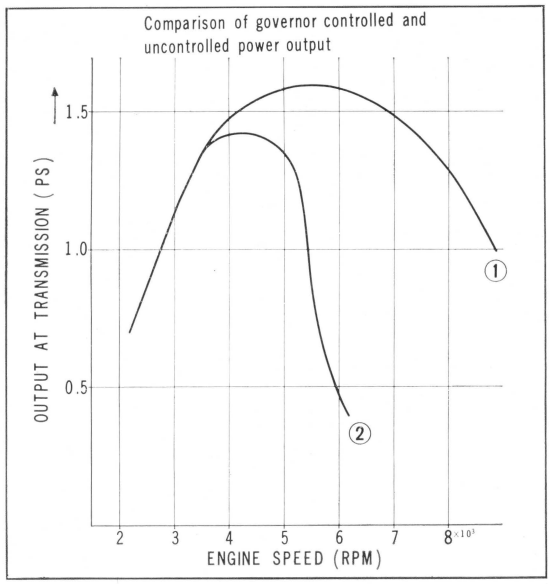


Fig. 3. 35 A (PC 50) Power output (transmission)
① Fixed at 30° B.T.D.C.
② Governor retarder 28° (For Netherland type)

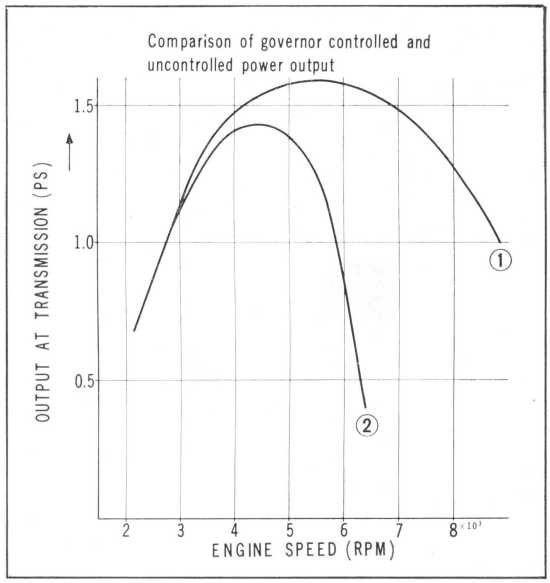


Fig. 3. 35 B (PS 50) Power output (transmission)
① Fixed at 25° B.T.D.C.
② Governor retarder 28° (For Netherland type)

Automatic Spark Advancer

To obtain the most effective use of the combustion pressure, the timing of the ignition must be advance as the engine speed increases. Considerable time will lapse before the combustible fuel mixture is completely burned after being iginited and the maximum combustion power is produced. The movement of the piston is very rapid and if the ignition should take place when the piston is a top-dead-center, the combustion will take place after the piston has started its downward movement and the maximum utilization of the combustion pressure cannot be realized. Therefore, the breaker points should open to produce the spark ignition just prior to the piston reaching top-dead-center, and as the engine speed increase, the igition must take place that much earlier.

Normally, centrifugal force is used and the amount of ignition advance is automatically controlled by the engine speed. This type advancer is kown as the automatic centrifugal spark advancer.

From the standpoint of safety, this automatic spark advancer is employed as a peed governor for Holland types. Up to the engine speed of 5,800 rpm (PS 50 : 5,500 rpm), the ignition will advance to 28° before top-dead-center, however, as the speed increases beyond this point, the governor will start retarding the amount of spark advance until at 6,300 rpm, the iginition will take place at 10° (PS 50 : 15°) top-dead-center and this will hold the speed of the motorcycle to maximum of 35 km/h (PS 50 : 40 km/h). This model is, in this way controlled to operate at the speed of maximum economy and performance which is 4,500 rpm (25 km/h). **(Fig. 3. 35, 36)**

Crankshaft

The crankshaft, in conjunction with the connecting rod, converts the reciprocating motion of the piston to the rotary motion.

The crankshaft consists of three major parts, the right crankshaft, left crankshaft and crank pin ; which are assembled into an integral unit by press fitting. It is supported at the both ends with 6202 and 6203 ball bearings.

The right and left crankshafts, and proportionally balanced to reduce vibration and they also serve as a flywheel. **(Fig. 3. 37)**

The crankshaft balance affects the riding comfort therefore, this balance has been designed to 5%.

(Crankshaft Balance)

The balance "A" (%) is computed by the following equation :

$$A=\frac{m}{M}=100$$

m : Gyrating mass (unbarance value)
M: Reciprocating mass

Gyrating mas (m) is obtained by subtacting the gyrating mass of the crankpin and the connecting rod from the total weight of the counterweight. Reciprocating mas (M) includes the reciprocating mass of the piston, piston pin, and connecting rod. It determines the balance in the X–X direction and Y–Y direction as shown in the **Fig. 3. 38.**

First of all, consider the case in which the rotating unit is in perfect balance (m=0). The inertia in the direction of X–X produced by the reciprocation motion of M acts intermittently, and sets up vibration within the engine. This is referred to as "0% balance". **(Fig. 3. 38)**

Next, 30% of the weight of M is placed on the opposite side of the crank pin, the inertia in the X–X direction in reduced to 0.7×M. However, the rotating section becomes unbalanced (m=0.3×M), and vibration is set up in Y–Y direction due to the centrifugal force. This is called "30% balance". To be more specific, the amount of vibration reduced in the X–X direction will be transferred to the Y–Y direction with the total always being equal regardless of the ratis of distribution. **(Fig. 3. 39)**

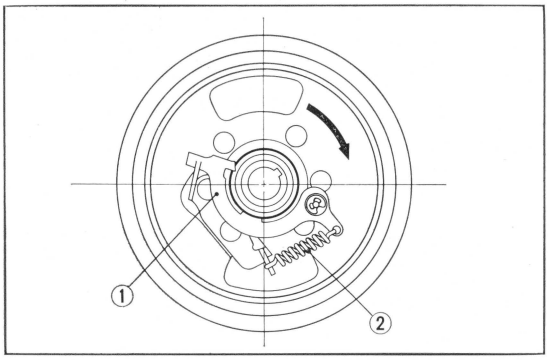


Fig. 3. 36 Governor operation
① Governor weight ② Spring

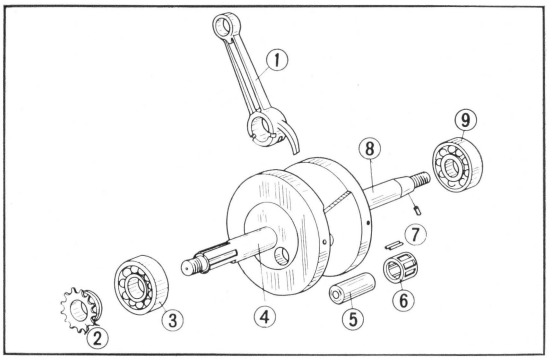


Fig. 3. 37 Crankshaft
① Connecting rod
② Timing sprocket
③ 6203 ball bearing
④ R. crankshaft
⑤ Crankpin
⑥ Roller retainer
⑦ 2×8 roller
⑧ L. Crankshaft
⑨ 6202 ball bearing

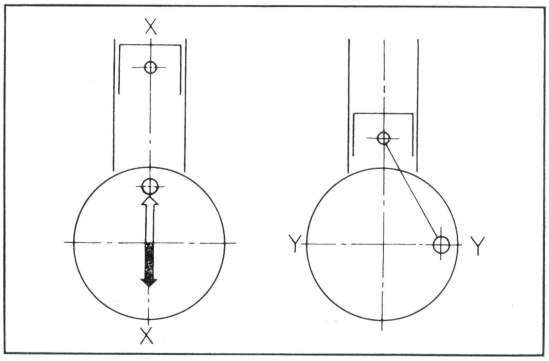


Fig. 3. 38 0% balance

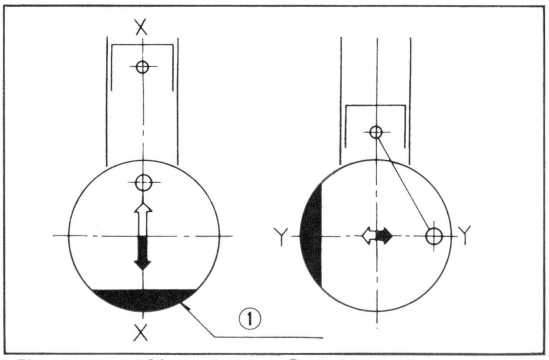


Fig. 3. 39 30% balance ① 30% of M

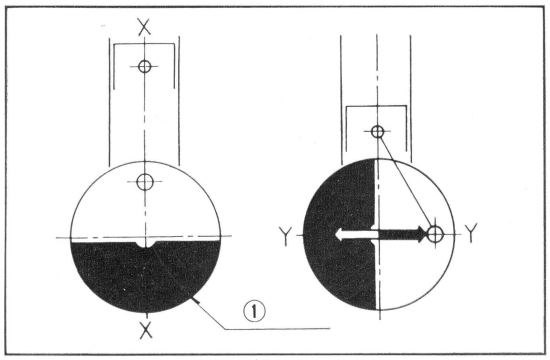


Fig. 3. 40 100% balance ① 100% of M

Further, if the counter weight is made equal to the M, all vibration in the X–X direction is transferred to the Y–Y direction. This is called "100% balance". **(Fig. 3. 40)**

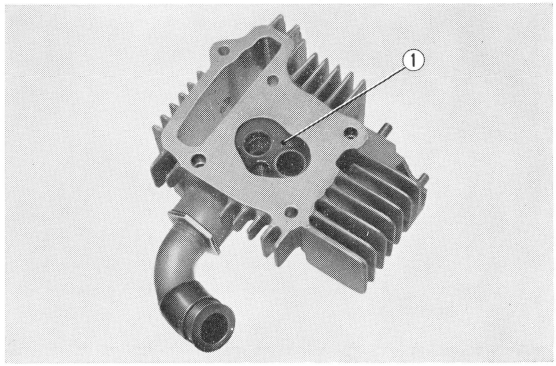


Fig. 3. 41 Cylinder head
① Combustion chamber

Combustion Chamber

The combustion chamber of PS/PS 50 is heart shaped, this allows the cylinder head to be made more compact in comparison with the spherical combustion chamber, and is possible to obtain a higher compression ratio.

In addition, its constructed affords better cooling as well as combustion efficiency. **(Fig. 3. 41)**

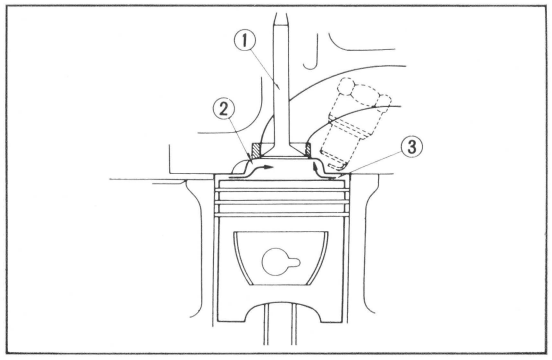


Fig. 4. 42 Squish area
① Valve
② Combustion chamber
③ Squish area

Squish Area

This is an area provided between the piston and the cylinder head to further compress part of the fuel air mixture at the end of the combustion stroke to create a turbulence within the main fuel mixture. As the swirling fuel mixture is diverted toward the spark plug the flame propagation is accelerated, allowing the leaner than normal fuel-air ratio or the slower burning fuel mixture to burn smoothly, and decreasing the tendency for knocking. **(Fig. 3. 42)**

Connecting Rod

The connecting rod plays the important role of converting the reciprocating motion of the piston caused by the combustion of air-fuel mixture to the rotary motion of the crankshaft.

It also transmits the inertia from the crankshaft to the piston so that the intake, compression, combustion and exhaust strokes can be performed. The material of construction must be light and rigid; therefore, "I" shaped nickel chrome steel is used in most cases.

The piston end is called the small end and is connected by a piston pin and locked with snap rings to prevent the piston pin from moving in the axial direction.

The crankshaft end is called the large end. The large end is fitted with the needle roller bearing to reduce friction and is assembled on the crankshaft with the crank pin. An oil splasher in shape of a scoop is attached to the large end to splash lubricate the crankshaft, cylinder and piston. **(Fig. 3. 43)**

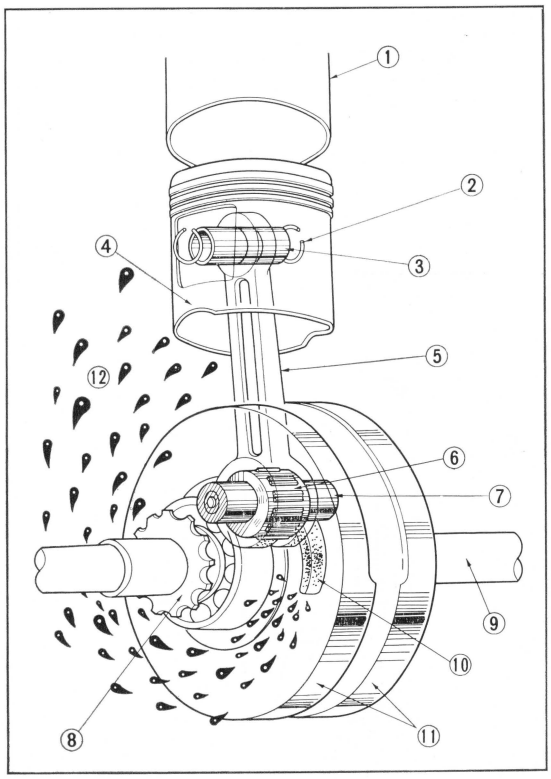


Fig. 3. 43 Operation of connecting rod

① Cylinder
② Snap ring
③ Piston pin
④ Piston
⑤ Connecting rod
⑥ Roller retainer
⑦ Crank pin
⑧ Timing sprocket
⑨ Crankshaft
⑩ Oil splasher
⑪ Crankshaft (R. L)

EXHAUST
(Exhausting the burned gases)

Muffler

If the hot combustion gas and high pressure is exhausted from the cylinder, the gas under pressure will attempt to expand suddenly and produce a loud noise.

In order to prevent this, the temperature and pressure of the burned gas must be reduced gradually, be routed from the cylinder to the muffler through the exhaust pipe where the gas can gradually by reduced in temperature and pressure before it is exhaust pipe where the gas can gradually be reduced in temperature and pressure before it is exhausted out side. **(Fig. 3. 44)**

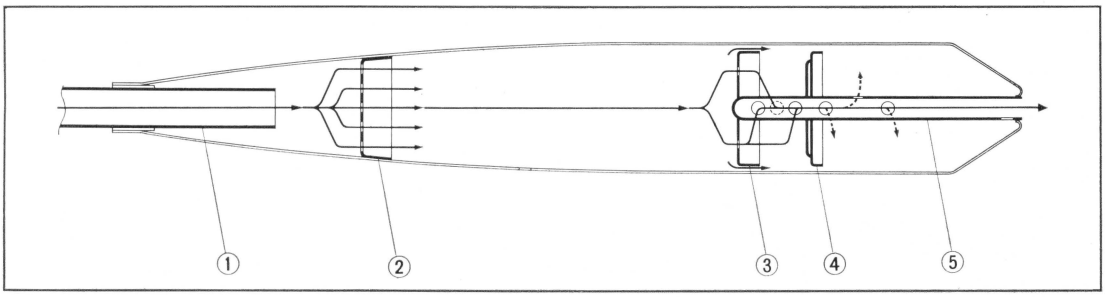


Fig. 3. 44 Construction of muffler

① Exhaust pipe
② eparator C
③ Separator A
④ Separator B
⑤ Tail pipe

Valve Operating Mechanism

The inlet and exhaust valves are installed in the cylinder head of the four-cycle engine. These are opened and closed to assist in performing the intake, compression, combustion and exhaust functions.

Types of Valve operating Mechanism

Side valve (SV) type
Overhead valve (OHV) type
Overhead camshaft (OHC)
Chain type
Gear type

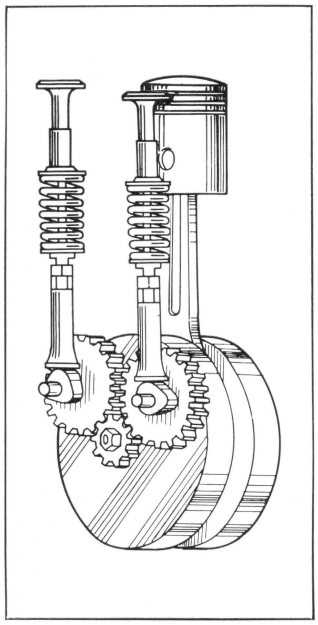


Fig. 3.45 Side valve type

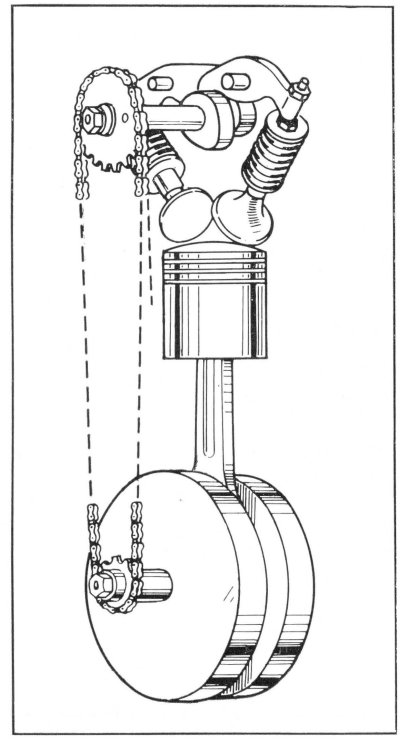


Fig. 3.49 Overhead camshaft type

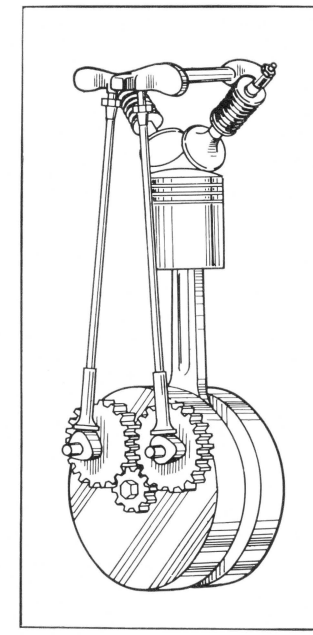


Fig. 3.46 Overhead valve

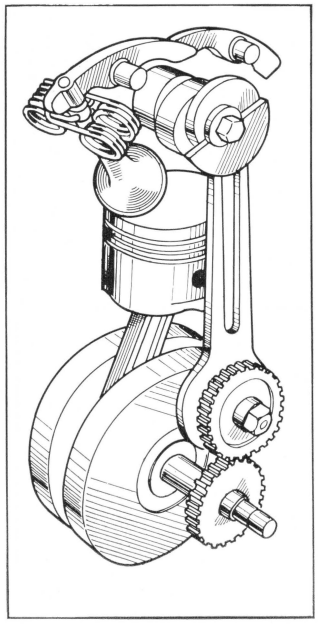


Fig. 3.47 Overhead camshaft type

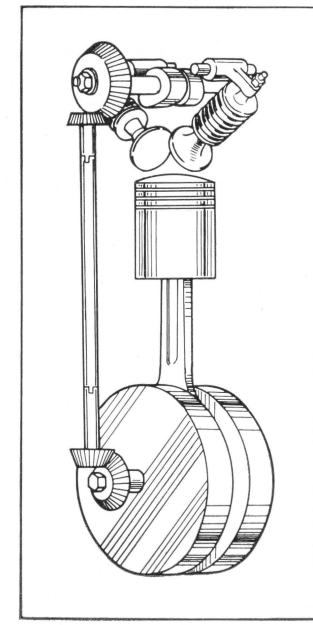


Fig. 3.48 Overhead camshaft type

Overhead Camshaft

When the part shown in the figure is revolved, the vartical rod moves up and down. **(Fig. 3. 50)**

The camshaft installed the cylinder head is revolved by the timing sprocket installed on the crankshaft through the cam chain. The camshaft actuates the rocker arms by providing a rocker movement which operates the valve. In order to maintain the cam chain at a specific tension so that the valve timing is not effected, a cam chain tensioner is installed within the crankcase to apply pressure against the chain by means of a roller through a spring. **(Fig. 3. 51)**

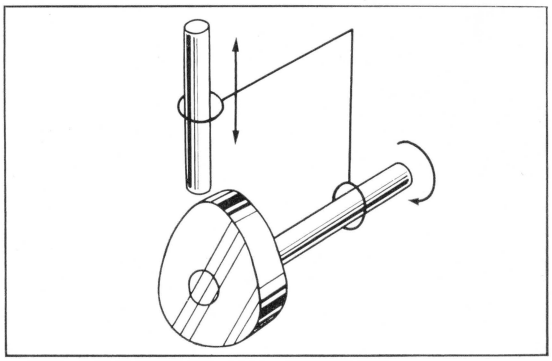


Fig. 3. 50 Principle of cam

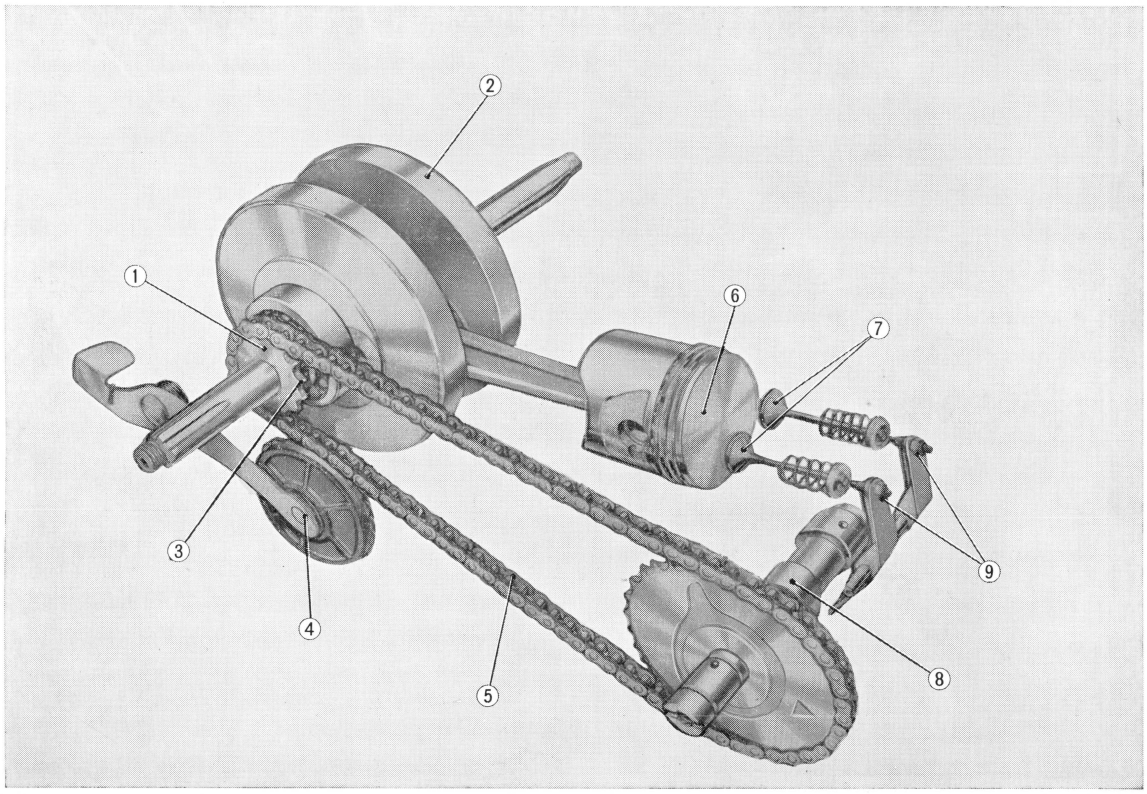


Fig. 3. 51 Overhead camshaft mechanism

① Timing sprocket
② Crankshaft
③ O mark
④ Camchain tensioner
⑤ Camchain
⑥ Piston
⑦ Valve
⑧ Camshaft
⑨ Rocker arm

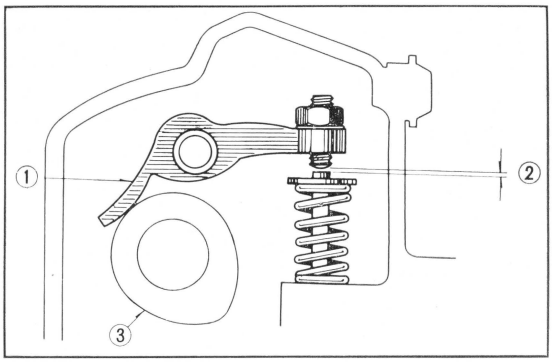


Fig. 3. 52 Valve tappet clearance
① Valve rocker arm ③ Camshaft
② Valve tappet clearance

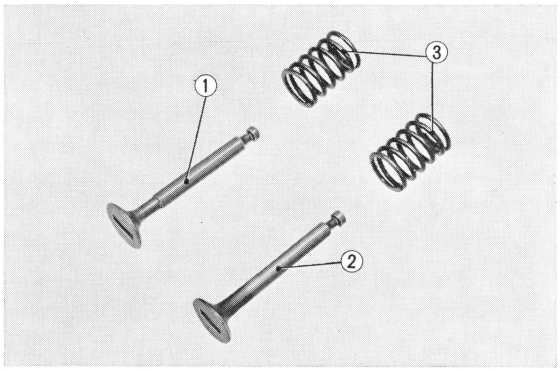


Fig. 3. 53 Valve & valve spring
① Exhaust valve ③ Valve spring
② Inlet valve

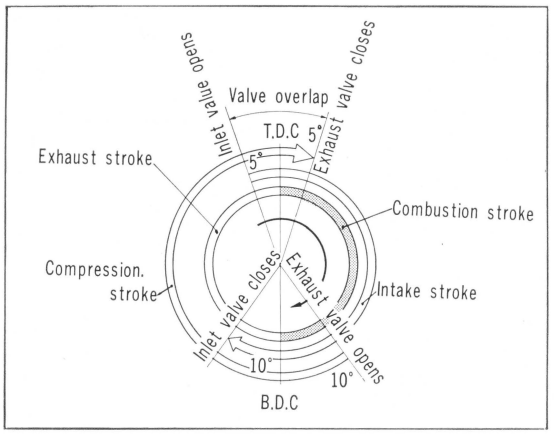


Fig. 3. 54 Valve timing diagram

Tappet Clearance

The clearance between the valve and rocker arm is referred to as the tappet clearance. Proper clearance is required for the valve to fully close. If the clearance is too small, it will keep the valve from completely closing, producing a low compression; on the other hand, if the clearance is too large, tappet noise results.

The tappet clearance will greatly affects the engine output, revolution and noise. Standard tappet clearance measured cold is **0.05 mm (0.002 in)** for both the inlet and exhaust valves. **(Fig. 3. 52)**

Valve Spring

Without the proper sealing of the valves maximum engine output and speed performance cannot be realized.

The valve spring applies force on the valve to keep it closed. The spring force should neither be too strong nor too weak. If the spring force is too weak, the valve will not close fully, resulting in loss of compression, exhaust leak, etc.; on the other hand, if the spring force is too strong, it requires unnecessary force to operate the valves and also cause rapid wear to the valve seat. **(Fig. 3. 53)**

Valve Timing

It may seem to be correct to have the inlet and exhaust valves opening and closing at top-dead-center and bottom-dead-center. However, as can be seen from **Fig. 3. 54**, the valves are not timed in this manner. If the inlet valve starts to open at top-dead-center, the piston will travel some distance before the valve becomes fully opened to take the air-fuel mixture into the cylinder. Consequently, sufficient air-fuel mixture is not obtained during the inlet stroke. Therefore, the inlet valve is timed to start opening several degrees before top-dead-center of the inlet stroke. In addition, the inertia will keep the air-fuel mixture flowing into the cylinder for several degrees beyond the bottom-dead-center of the inlet stroke. To take full advantage of the intake fuel enertia to obtain greater power output from the engine, the inlet valve is kept open several degrees beyond bottom-dead-center.

In a similar manner, the exhaust valve opens several degrees before bottom-dead-center of the power stroke in order to utilize difference in pressure between the inside and outside of the cylinder for greater scavenging of the exhaust gas from the cylinder. The valve closes several degrees past top-dead-center beyond the exhaust stroke in order to utilize the exhaust gas inertia to completely rid the cylinder of the exhaust gas.

During the period of several degrees before and after top-dead-center to the exhaust stroke, both the inlet and exhaust valves are opened ; this period is called "valve overlap", and it serves to prevent the residual exhaust gases from blocking the entry of the air-fuel mixture. **(Fig. 3. 54)**

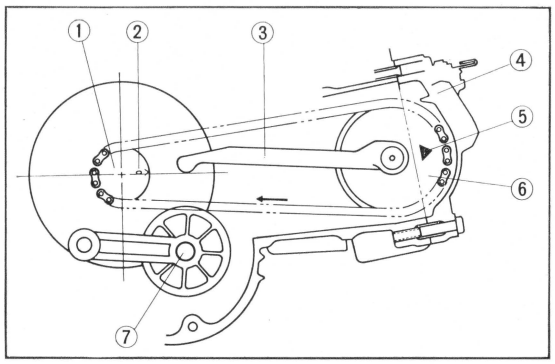


Fig. 3. 55 Valve timing

① Timing sprocket
② O mark
③ Oil guide
④ Cylinder head cover
⑤ Triangular timing mark
⑥ Cam sprocket
⑦ Chain guide roller

Correct Valve Timing Procedure

The proper valve timing is accomplished by aligning both the punch timing mark on the crankshaft mounted timing sprocket and the triangular timing mark on the cam sprocket along the cylinder center line and in the direction of the head. In this position, connect the cam chain between the two sprocket. **(Fig. 3. 55)**

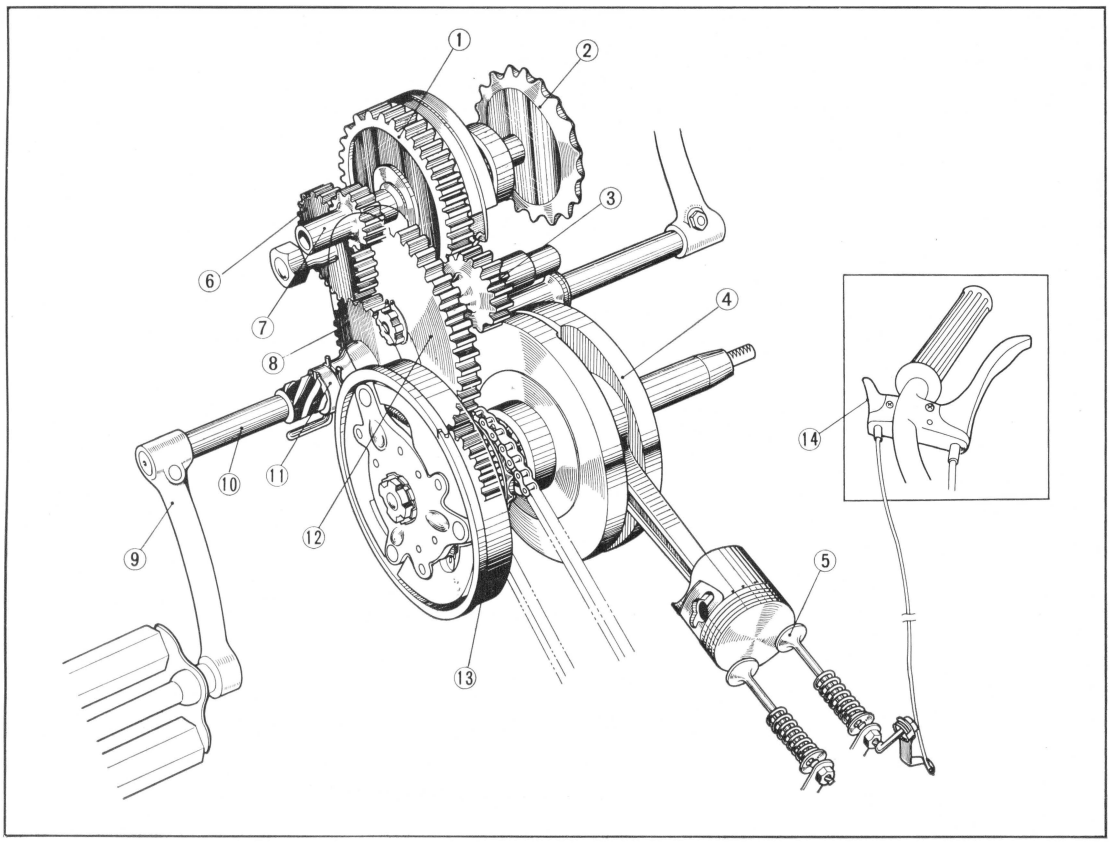


Fig. 3. 56 Power transmission mechanism

① Counter shaft gear
② Drive sprocket
③ Mainshaft
④ Crankshaft
⑤ Exhaust valve
⑥ Starter idle gear
⑦ Countershaft
⑧ Starter gear
⑨ Crank arm
⑩ Pedalshaft
⑪ Starter drive ratchet
⑫ Primary driven gear
⑬ Clutch
⑭ Decompression lever

POWER TRANSMISSION MECHANISM

Change in the speed to the power produced by the engine is performed by the transmission. The PC 50 is a direct power drive having only a single speed therefore there are no gear change operation. **(Fig. 3. 56)**

The PS 50 is equipped with a three speed transmission. The gear speed selection is made by twisting the gear change handle grip on the left handle bar. **(Fig. 3. 57)**

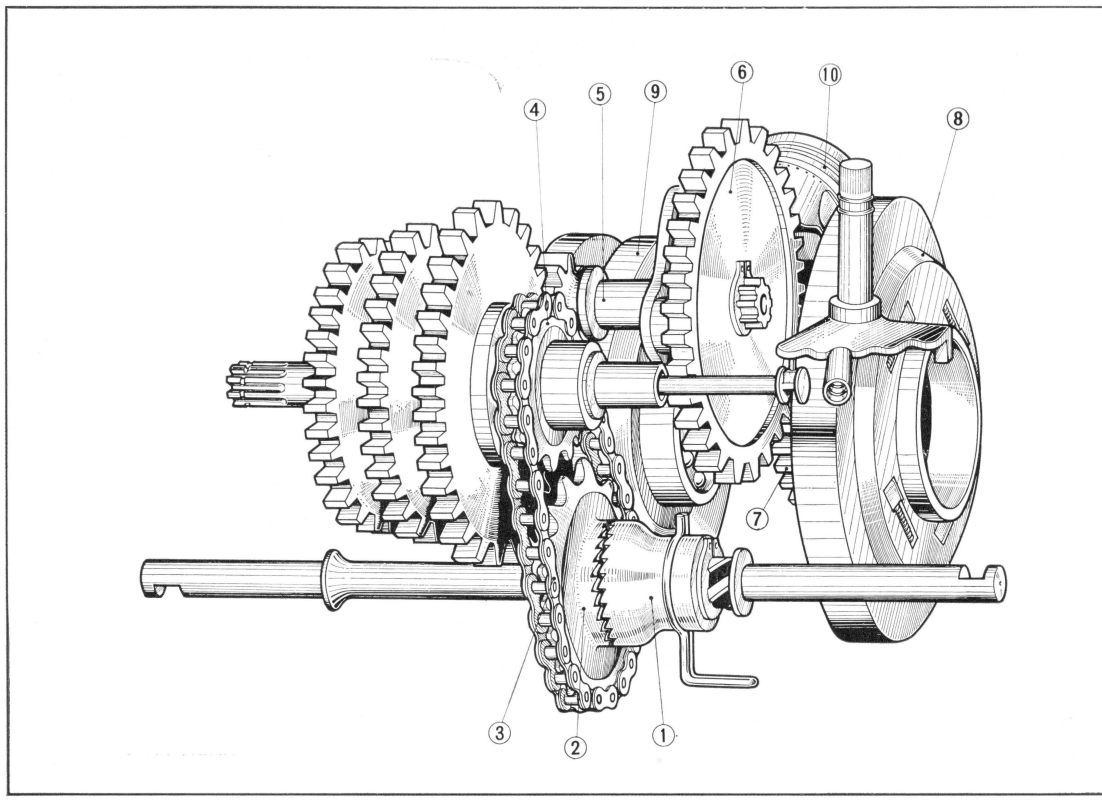


Fig. 3. 57

① Starter drive ratchet
② Starter drive sprocket
③ Pedal shaft chain
④ Counter shaft low gear (sprocket)
⑤ Main shaft
⑥ Primary driven gear
⑦ Primary drive gear
⑧ Clutch
⑨ Crankshaft
⑩ Piston

To perform the gear change, grasp the clutch lever first to disengage the power to the main shaft and then twist the gear change handle grip inward to the gear position indicated on the handle. The action of the gear change grip is transmitted by cable to rotate the gear shift arm. The gear change shift arm is connected to the gear change shaft, and the gear change pawl is connected within countershaft.

The gears on the countershaft rotate freely. Even through the power is transmitted from the main shaft gear to the countershaft gear, the power is not transmitted to the countershaft. However, if the gear change pawl is inserted into the groove on the countershaft gear and the shaft becomes and integral unit, the countershaft will turn, and the power is transmitted to the drive sprocket and then to the rear wheel.

(Neutral position)

When the gear shift arm is in the position shown in **Fig. 3. 58**, the gear change pawl is not engaged with the gear and, therefore, the power from the main shaft gear is not transmitted to the countershaft.

(Low gear position)

The gear shift arm is in position ① shown in **Fig. 3. 59**, the gear change pawl is engage with the countershaft low gear.

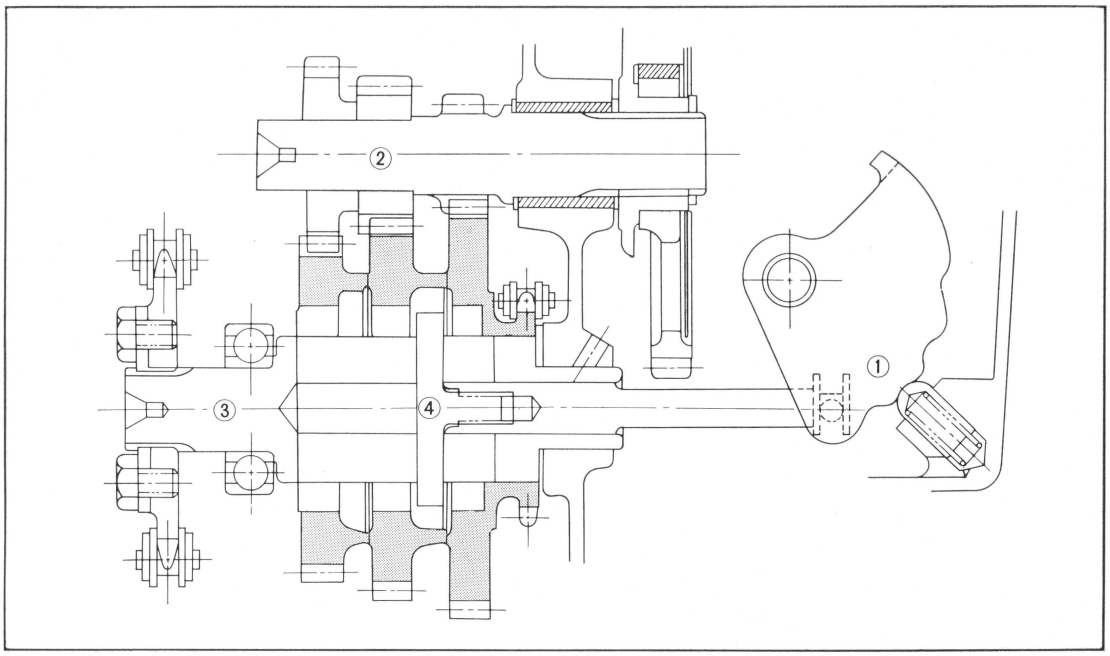


Fig. 3. 58 Neutral

① Gear shift arm
② Transmission mainshaft
③ Transmission countershaft
④ Gear change pawl

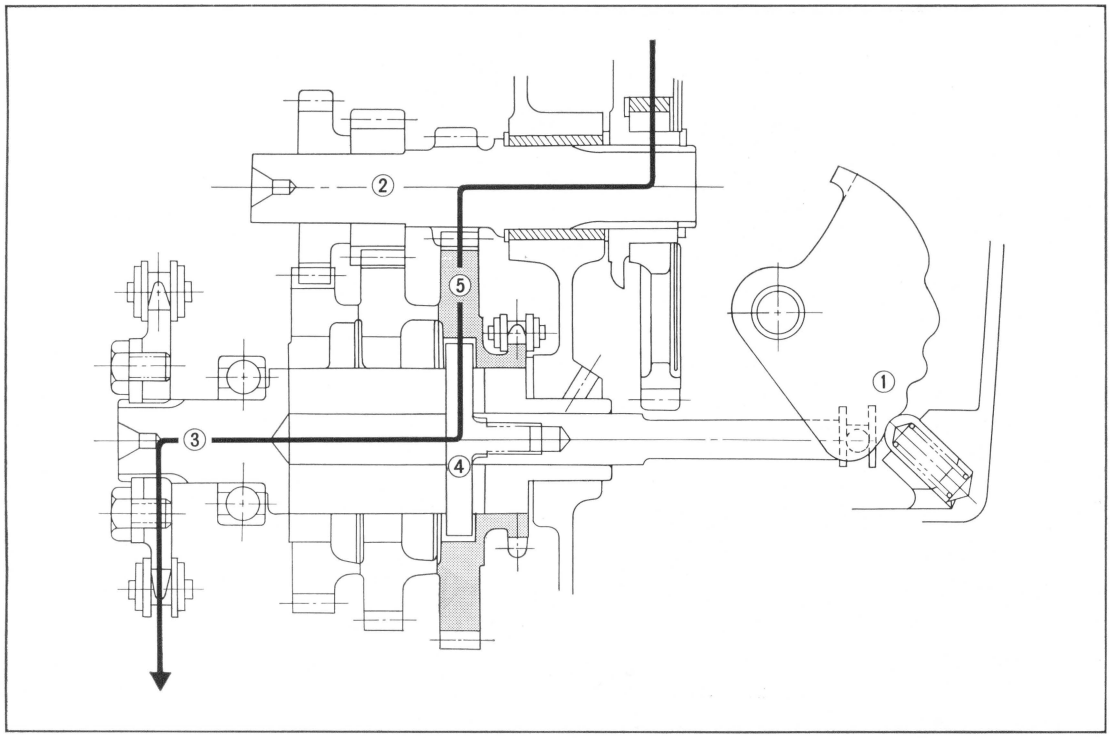


Fig. 3. 59 Low gear

① Gear shift arm
② Transmission mainshaft
③ Transmission countershaft
④ Gear change pawl
⑤ Countershaft low gear

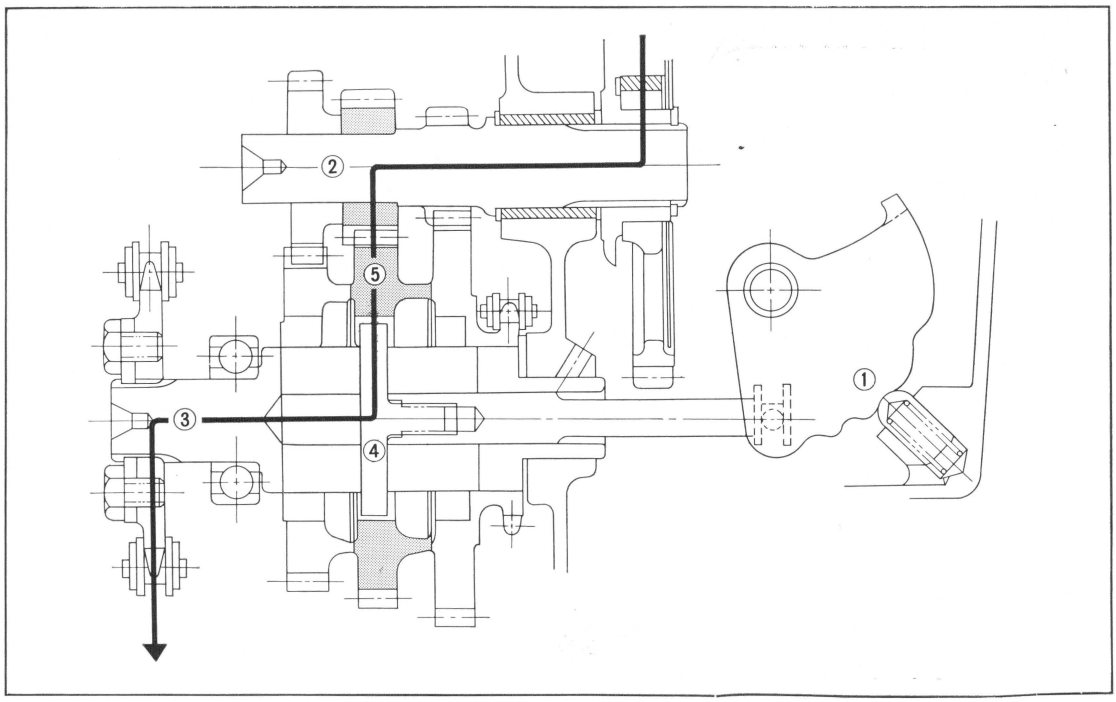


Fig. 3.60 Second gear

① Gear shift arm
② Transmission mainshaft
③ Transmission countershaft
④ Gear change pawl
⑤ Countershaft second gear

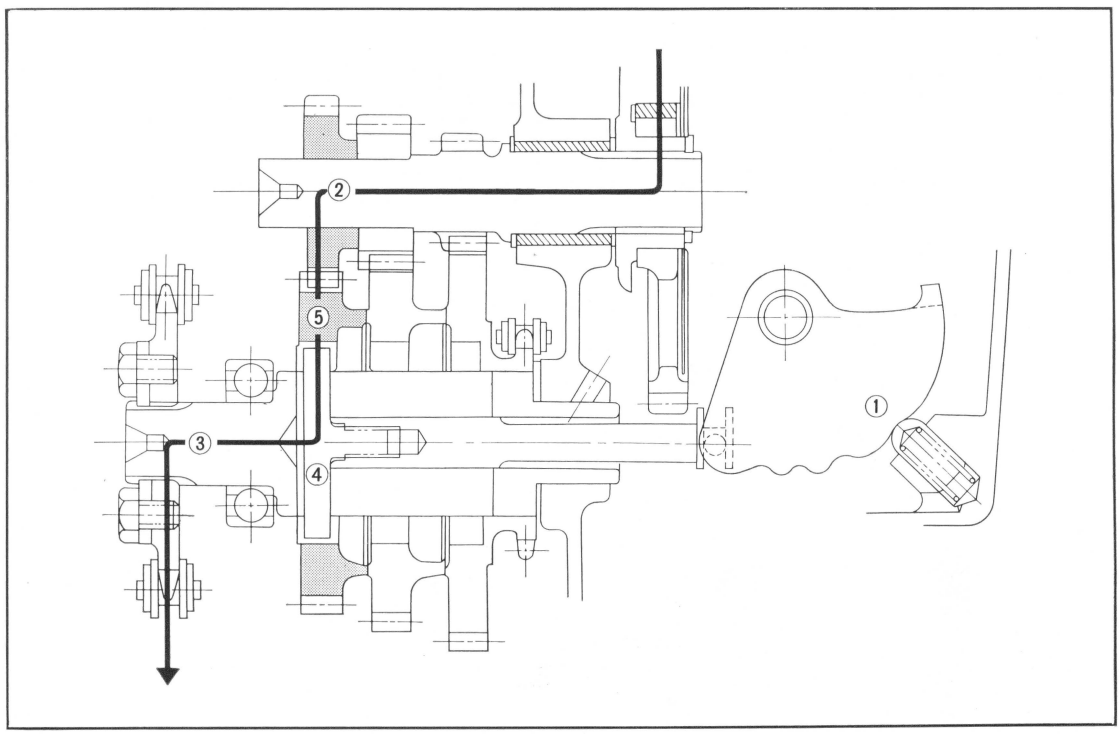


Fig. 3.61 Top gear

① Gear shift arm
② Transmission mainshaft
③ Transmission countershaft
④ Gear change pawl
⑤ Countershaft top gear

(2nd gear position)

The gear shift arm ① is in position shown in **Fig. 3. 60**, the gear change pawl is engaged with the countershaft 2nd gear.

(Top gear position)

In top gear, the gear shift arm is in position ② shown in **Fig. 3. 61**, the gear changed pawl is engaged with the counter shaft top gear.

CLUTCH

(PC 50)

The clutch engages and disengages the power from the crankshaft to the rear wheel.

When changing speed, the power must be disengaged temporarilly; when starting, the power must be transmitted smoothly to the rear wheel.

PC 50 has adopted the centrifugal clutch which performs the operations automatically. **(Fig. 3. 62)**

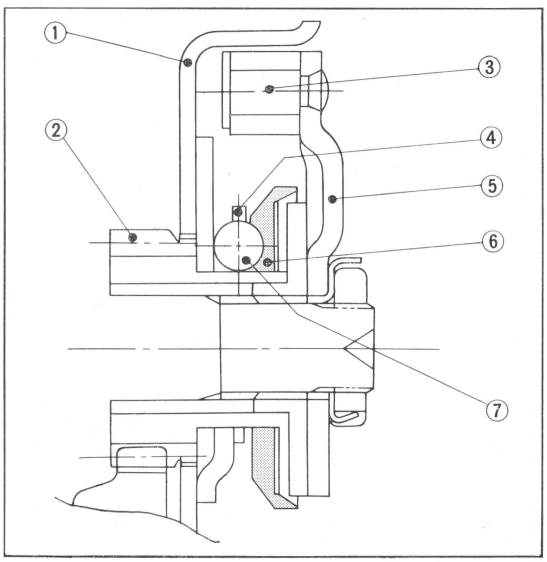


Fig. 3. 62 Sectional view of clutch

① Clutch outer
② Primary drive gear
③ Clutch shoe
④ Ball retainer
⑤ Drive plate
⑥ Friction plate
⑦ Steel ball

Automatic Centrifugal Clutch

By utilizing centrifugal force, the clutch engages and disengages the power automatically in accordance with the engine rpm. The drive plate and clutch weights are fixed on the crankshaft, while the primary drive gear rotates freely around the crankshaft. At low speed, the clutch weights are not actuated so that the crankshaft rotation is not transmitted to the drive gear. As the speed increases, centrifugal force causes the weights to move outward, overcoming the clutch spring force, to make contact with the primary drive gear so that the power may be transmitted to the primary driven gear. **(Fig. 3. 63)**

In PC 50 the engine is started by pedaling. Therefore, if the clutch falis to transmit the force produced by pedaling to the crankshaft, the engine will not start.

When the pedal is depressed, the primary drive gear starts rotating and causes the three steel balls incorporated therein to apply force against the friction plate which in turn makes contact with the drive plate (the friction plate is restricted in the direction of rotation by the clutch weights), so that the power is transmitted from the drive plate to the crankshaft.

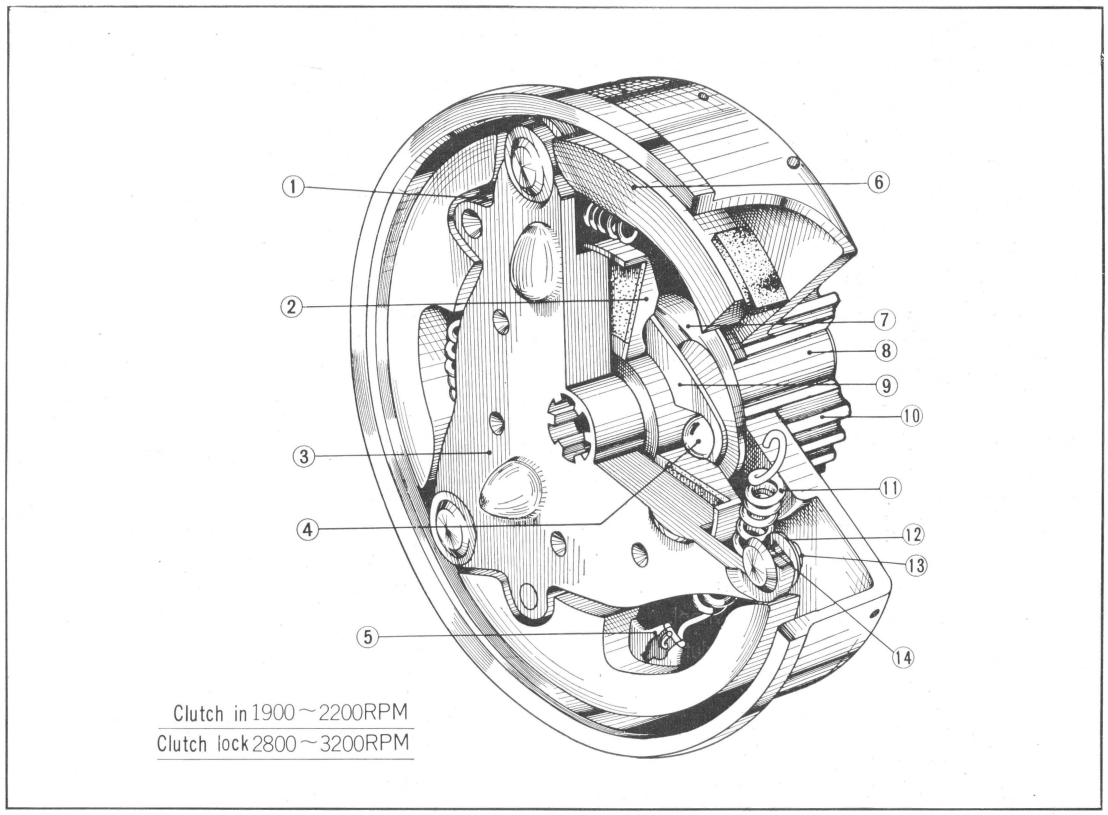


Fig. 3.63 Sectional view of clutch (PC 50)

① Clutch damper rubber
② Friction plate
③ Drive plate
④ Steel ball
⑤ Hook protector
⑥ Clutch weight
⑦ Lifter cam
⑧ Clutch center guide
⑨ Ball retainer
⑩ Primary drive gear
⑪ Clutch spring
⑫ 6 mm thrust washer
⑬ 6 mm cir-clip
⑭ Clutch weight 6 mm pin

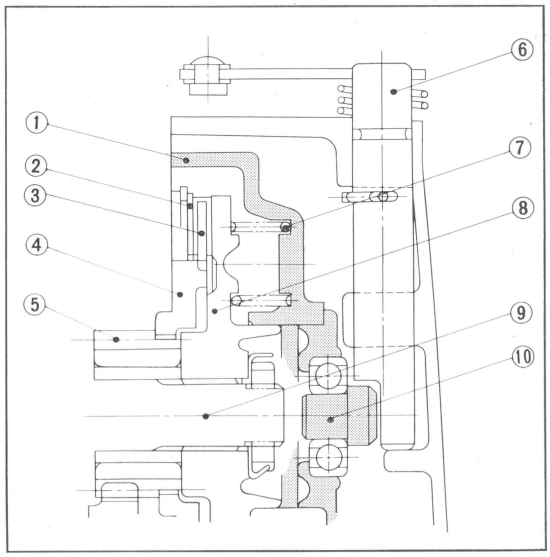


Fig. 3.64 Sectional view of clutch (PS 50)

① Clutch outer
② Clutch plate
③ Clutch friction disc
④ Clutch center
⑤ Primary drive gear
⑥ Clutch lever
⑦ Clutch spring
⑧ Drive plate
⑨ Crankshaft
⑩ Clutch outer cover pin

(PS 50)

The PS 50 utilizes a manual, single, wet plate type clutch, a drive plate is spline mounted to the crankshaft and to this coupled a clutch outer through clutch springs. The clutch plate is fitted to the internally grooved clutch outer and assembled together with a friction disc by set ring at present the crankshaft rotation is transmitted to the drive plate, clutch outer and clutch plate in turn, however, when the clutch is in motion, the friction disc is engaged with the clutch plate by the friction force of the clutch spring. The force is further transmitted from the friction disc to the internally fitted clutch center which is spline jointed to the primary drive gear.

Next, when the clutch lever is operated, a force is applied to the clutch outer by the action of the clutch outer cover pin and disengages clutch plate from the friction disc, disrupting the transmission of power, between the crankshaft and transmission. **(Fig. 3. 64)**

Engine Disengaging Lever

The PC/PS50 can also be operated with a pedal by the selection of the disengaging lever. The engine disengaging lever on the PC 50 is located on the right rear of the engine. By shifting this lever to the horizontal position, the gears will be disengaged and it can be pedaled like a bycicle.

NOTE :

When switching this disengaging lever, the engine must be stopped.

Engine engage position

Shift the lever to the vertical position by moving the lever along the groove in the right crankcase cover will engage the engine. **(Fig. 3. 65)**

The free pawl ② mounted on the transmission countershaft ④ enters the groove on the transmission countergear ③ by the force of the spring. The countershaft and counter gear becomes and integral unit and revolves together.

The engine power developed by the engine is transmitted to the transmission main shaft ① by the way of the crankshaft, clutch, drive and driven gear. However the main shaft gear (14 T) is engaged with the countershaft gear (45 T) and therefore the power is also transmitted to the countershaft.

A drive sprocket (15 T) is mounted on one and of the countershaft to transmit the power to the rear wheel by means of a chain drive. **(Fig. 3. 65)**

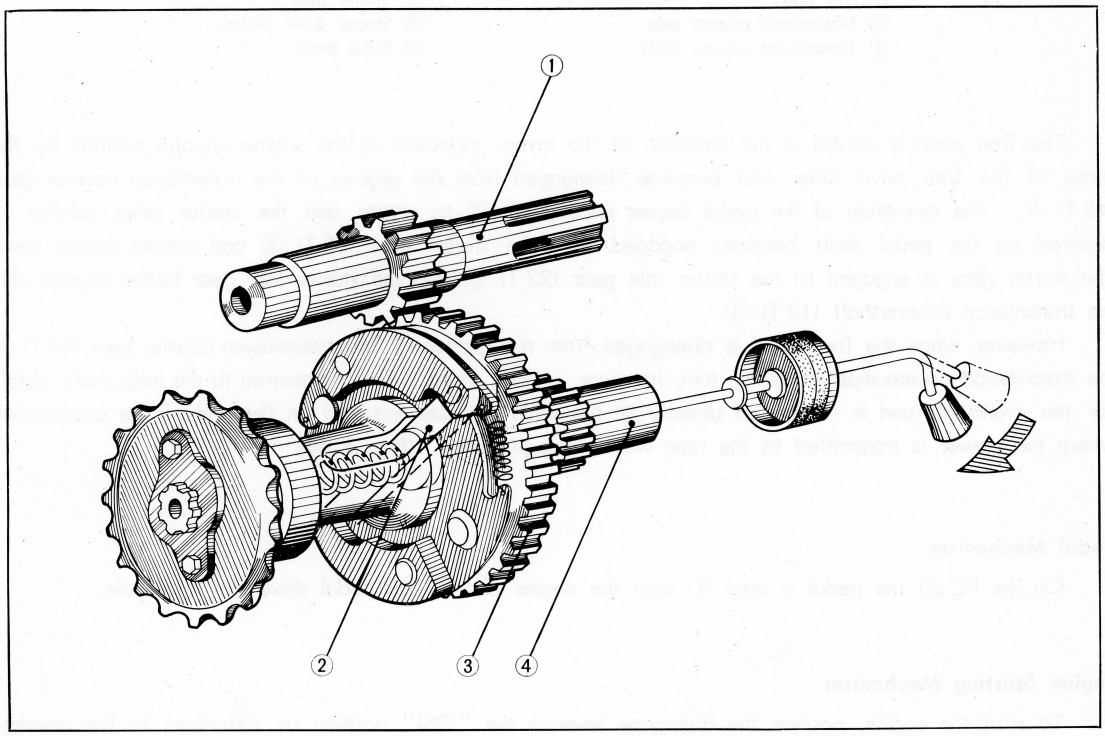


Fig. 3. 65 Motorcycling

① Transmission mainshaft
② Free pawl
③ Transmission countergear
④ Transmission countershaft

Pedal engage position

Position the lever to the horizontal, "OFF" position, and the gears will move in the direction of the arrow in **Fig. 3. 66.**

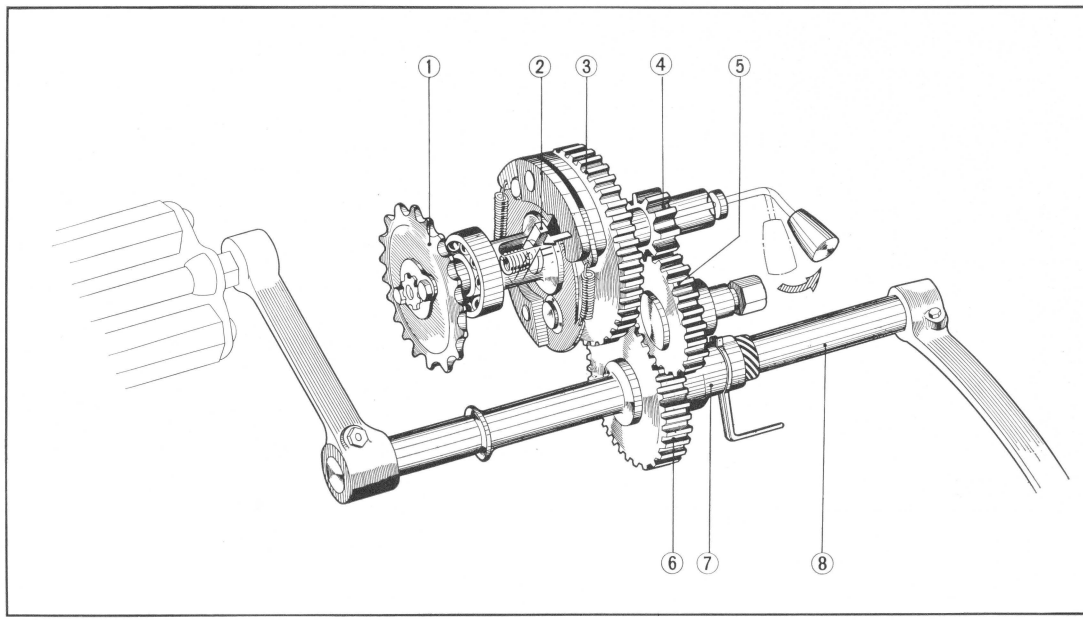


Fig. 3.66 Pedaling

① Drive sprocket
② Free pawl
③ Transmission counter gear
④ Transmission counter shaft
⑤ Starter idle gear
⑥ Starter gear
⑦ Starter drive ratchet
⑨ Pedal shaft

The free pawl is moved in the direction of the arrow, opposite to the engine engage position by the force of the free pawl slider and becomes disengaged from the groove of the transmission counter gear (45 T) ③. The operation of the pedal causes pedal shaft ⑧ to rotate and the starter drive ratchet ⑦ mounted on the pedal shaft becomes engaged with the starter gear (38 T) ⑥ and rotates starter gear. The starter gear is engaged to the starter idle gear (22 T) ⑤ and the starter idle gear further engage with the transmission countershaft (12 T) ④.

However, since the free pawl is disengaged from the groove of the transmission counter gear (45 T) ③ the transmission countershaft does not turn, however, driving force is not transmitted to the main shaft, clutch, for the crankshaft and is transmitted directly to the drive sprocket mounted on the end of the countershaft where the power is transmitted to the rear wheel through chain. **(Fig. 3.66)**

Pedal Mechanism

On the PC 50 the pedal is used ① start the engine and ② for pedal drive like a bicycle.

Engine Starting Mechanism

To start the engine, position the disengage lever in the "ON" position as described in the previous paragraph. As the pedal shaft is turned, the starter drive ratchet which is engaged by the left hand square thread to the pedal shaft, moves in the direction of the arrow and engages with the teeth cut on the side of the starter gear and causes the starter gear to turn (The starter gear rotates freely on the pedal shaft). This causes the power to be transmitted through the starter idle gear, transmission countershaft gear, transmission mainshaft, driven gear, clutch, and after transmission through the connecting rod, the piston is actuated. However, to reduce the pedaling force for starting, a decompression lever is incorporated, which was described in the previous section, to facilitated starting.

When the engine start, the starter gear will rotate, however, the spring within the starter drive ratchet forces the starter gear to return to the original position and the starter drive ratchet and the starter gear will become disengaged, preventing the engine rpm from driving the pedal shaft. **(Fig. 3. 67)**

Pedaling Mechanism

For pedaling, position the disengaging lever to the "OFF" position.

When the pedal is pressed, the starter drive ratchet engages with the starter gear as described in the previous section, and rotates starter idle gear and the transmission countershaft. However, since the free pawl is disengaged from the groove of the transmission counter gear, no power is transmitted to the transmission counter gear, and the power is transmitted to the drive sprocket where it is transmitted to the rear wheel through the drive chain. **(Fig. 3. 68)**

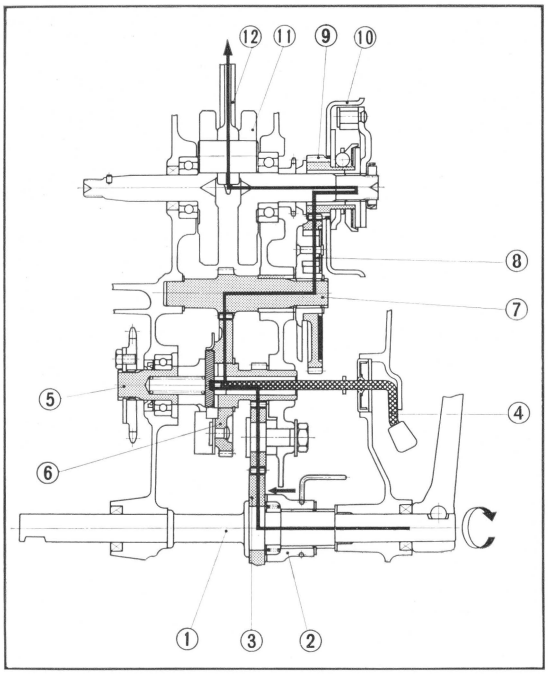


Fig. 3. 67

① Pedal shaft
② Starter drive ratchet
③ Starter gear
④ Disengaging lever
⑤ Transmission countershaft
⑥ Countershaft gear
⑦ Transmission mainshaft
⑧ Primary driven gear
⑨ Primary drive gear
⑩ Clutch
⑪ Crankshaft
⑫ Connecting rod

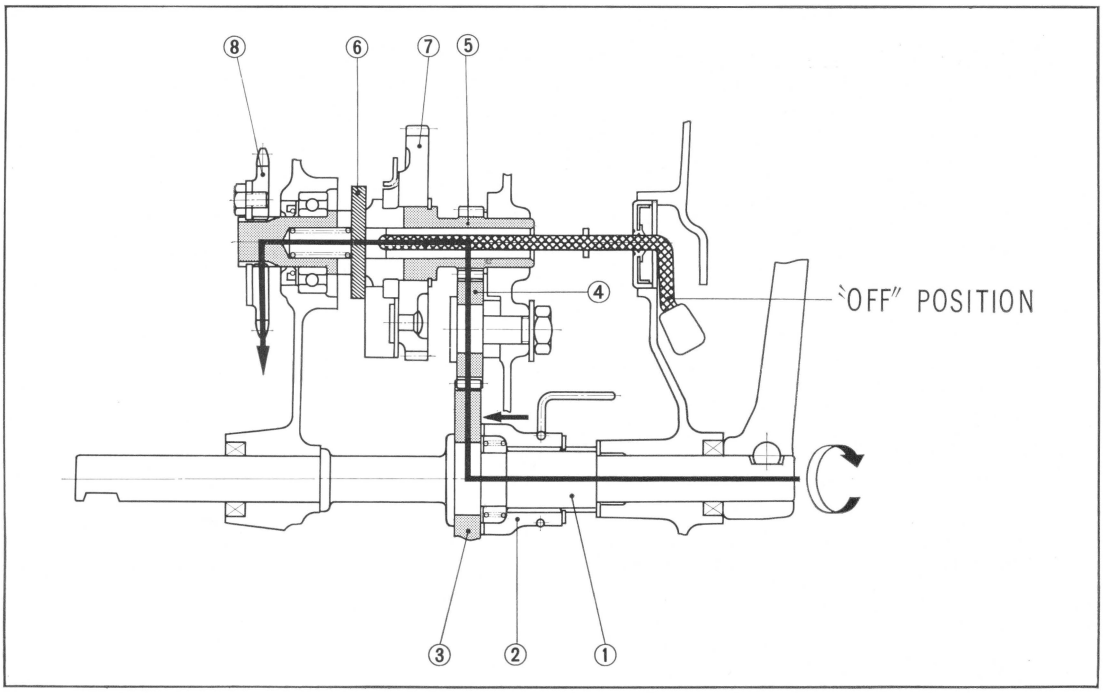


Fig. 3. 68

① Pedal shaft
② Starter drive ratchet
③ Starter gear
④ Starter idle gear
⑤ Transmission countershaft
⑥ Free pawl
⑦ Transmission counter gear
⑧ Drive sprocket

(PS 50)

Engine Starting Mechanism

The engine can be started either by shifting the transmission into neutral or by leaving the transmission in gear and disengaging the clutch by grasping the clutch lever, and using the pedal. After picking up momentum, shift into gear or reengaging the clutch. As the pedal shaft is turn the forward direction, the starter drive ratchet which is mounted on the pedal shaft through square left hand thread moves in the direction of the arrow and the starter drive sprocket (this sprocket rotates freely on the pedal shaft) engages with the teeth cut on the side of the starter drive sprocket. This turn the starter drive sprocket and since the pedal shaft chain is mounted on the counter shaft low gear sprocket, the power is transmitted from the counter shaft low gear to the main shaft, primary driven gear, drive gear, clutch, crankshaft and the connecting rod to move the piston. As the engine starts, the starter drive sprocket will rotate, however, the starter drive ratchet will return to the original position by the force of the starter sprocket set spring, and disengages from the sprocket. The power, therefore, is not transmitted to the pedal shaft. **(Fig. 3. 69)**

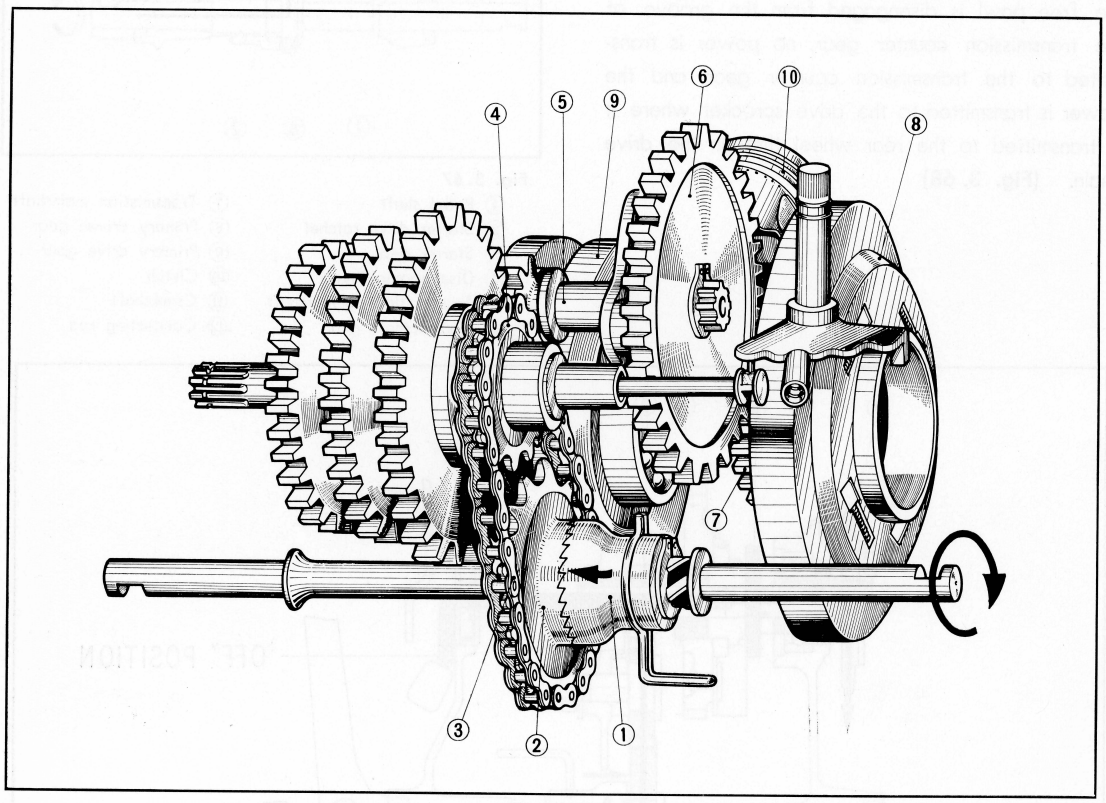


Fig. 3. 69

① Starter drive ratchet
② Starter drive sprocket
③ Pedal shaft chain
④ Counter shaft low gear (sprocket)
⑤ Main shaft
⑥ Primary driven gear
⑦ Primary drive gear
⑧ Clutch
⑨ Crankshaft
⑩ Piston

Pedaling

Pedaling is performed by locking the clutch lever (clutch disengaged position) and maintaining the transmission gear engaged. This will permit pedaling in same way as bicycle is pedal. When pedaling, the starter drive ratchet ① will be engaged with the teeth cut on the side of starter drive sprocket ②, as described in the previous section, and also engage with the countershaft low gear ③ through the chain.

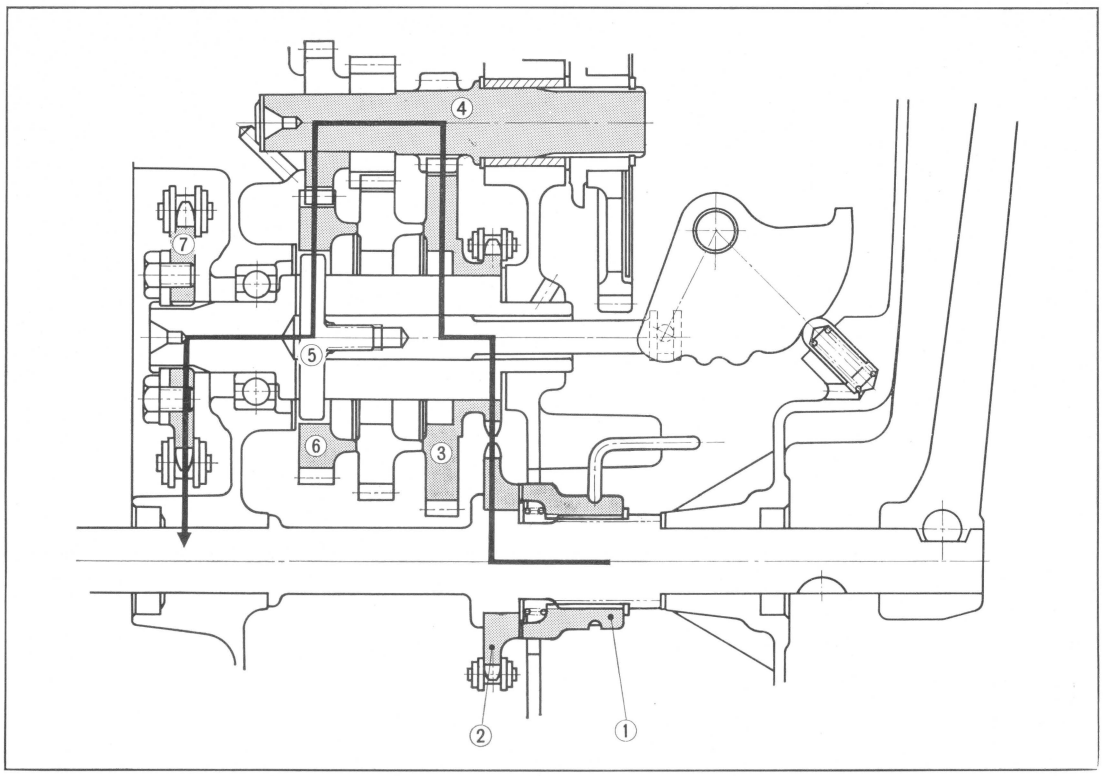


Fig. 3.70

① Starter drive ratchet
② Starter drive sprocket
③ Countershaft low gear
④ Transmission mainshaft
⑤ Gear change pawl
⑥ Countershaft top gear
⑦ Drive sprocket

This will cause the main shaft ④ to rotates and the same time causes the main shaft gear and also countershaft gear and also countershaft to rotates. Twist the gear change grip to select the desired transmission gear position ①, ② or ③ (for pedaling, use the 3rd gear position as it will be the fastest speed and the gear change pawl ⑤ will engage with the countershaft top gears ⑥ through the action of the gear change cable. For this reason the power is transmitted to the countershaft through the gear change pawl, drive sprocket ⑦ is rotated and the power is transmitted to the rear wheel. Further, since main shaft is also transmitted to the drive gear, driven gear and to the clutch. However, since the clutch is disengaged the power is not transmitted to the clutch and crankshaft, providing a light pedaling action. **(Fig. 3.70)**

Starting and Stopping the engine

To start the engine of the PC 50, start pedaling, this will rotate the crankshaft. However, because of the engine compression, pedalling is difficult ; this is overcomed by releasing the cylinder compression so that the crankshaft will turn lightly. A decompression lever is located on the left handle.

To be more specific, with the decompression lever held down, continue pedaling until a certain speed is attained ; then, release the lever to start the engine.

To stop the engine, on the other hand, turn the throttle grip back and depress the decompression lever. **(Fig. 3.71)**

NOTE :

1. The decompression lever must not be depressed while the engine is running, except to stop.
2. To stop the engine, the motorcycle must be brought to a full stop before depressing the decompression.

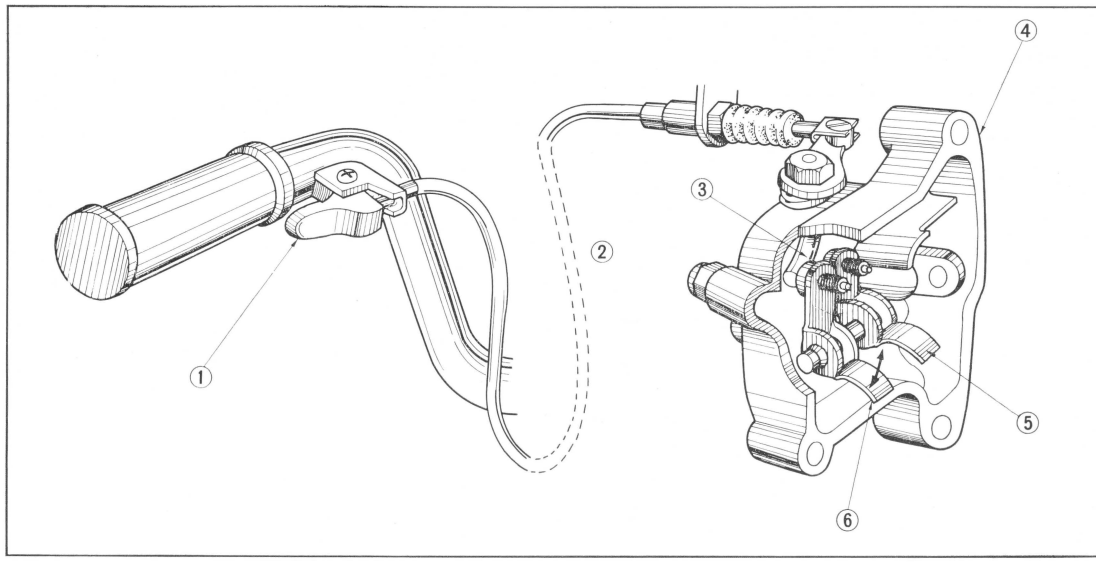


Fig. 3.71 Decompression lever operation

① Decompression lever
② Decompression cable
③ Decompression arm
④ Cylinder head
⑤ Rocken arm (Inlet side)
⑥ Actuate exhaust rocker arm to open valve

LUBRICATION SYSTEM

Cylinder Head

Oil from the cam chain tensioner roller and the cam chain is carried along the crankcase ribs to drop into the oil guide, from where it is fed to the cylinder head through the oil guide.

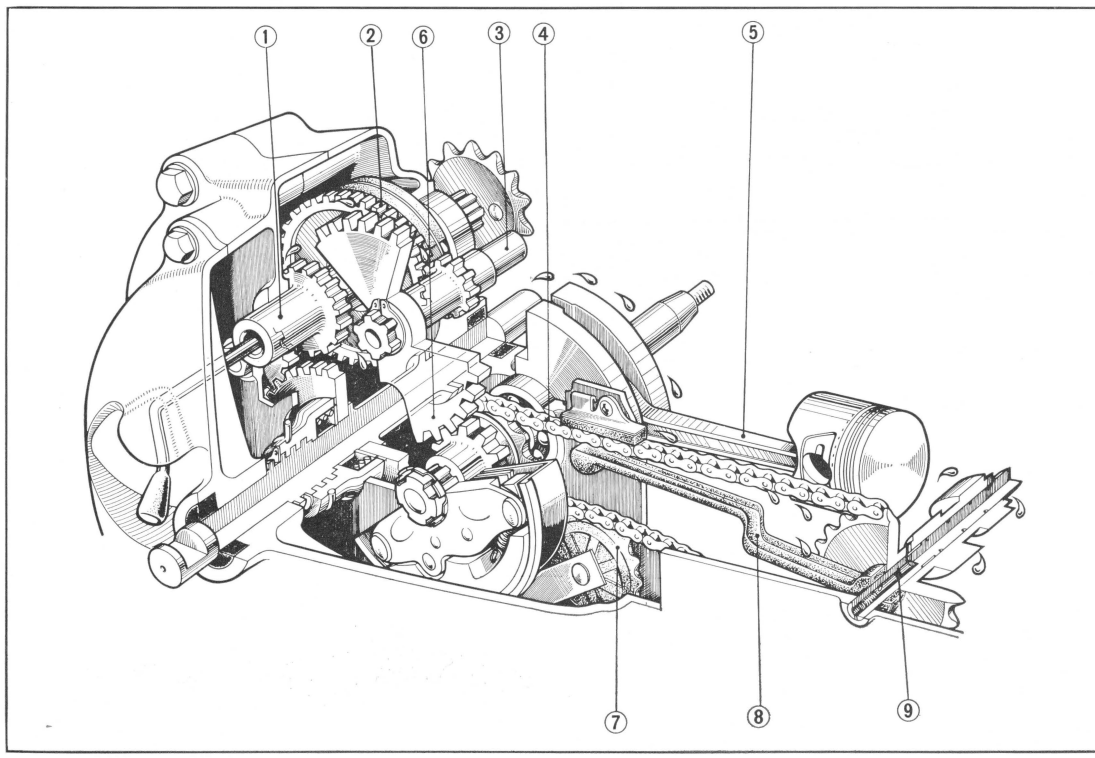


Fig. 3.72 Oil lubrication system

① Transmission counter shaft
② counter gear
③ main shaft
④ Cam chain
⑤ Connecting rod
⑥ Primary driven gear
⑦ Cam chain tensioner
⑧ Oil guide
⑨ Cam shaft center pin

Oil enters the camshaft center pin and by centrifugal force is drawn into the spiral groove in the center pin to lubricate the cam surface as well as the rocker arm slipper surface.

After lubricating the camshaft, oil passes through the cam chain chamber and flows back to the crankcase.

Crankcase

The oil dipper on large in of the connecting rod scoops up the oil and lubricates the piston and piston pin. Oil holes are provided in the supports of both end of mainshaft and at the left crankcase bearing support of the countershaft to provide lubrication to those parts, preventing seizures. Further, the oil which has been picked up by the cam tensioner roller and the cam chain flows through the oil guide and lubricates the cam shaft center pin and camshaft.

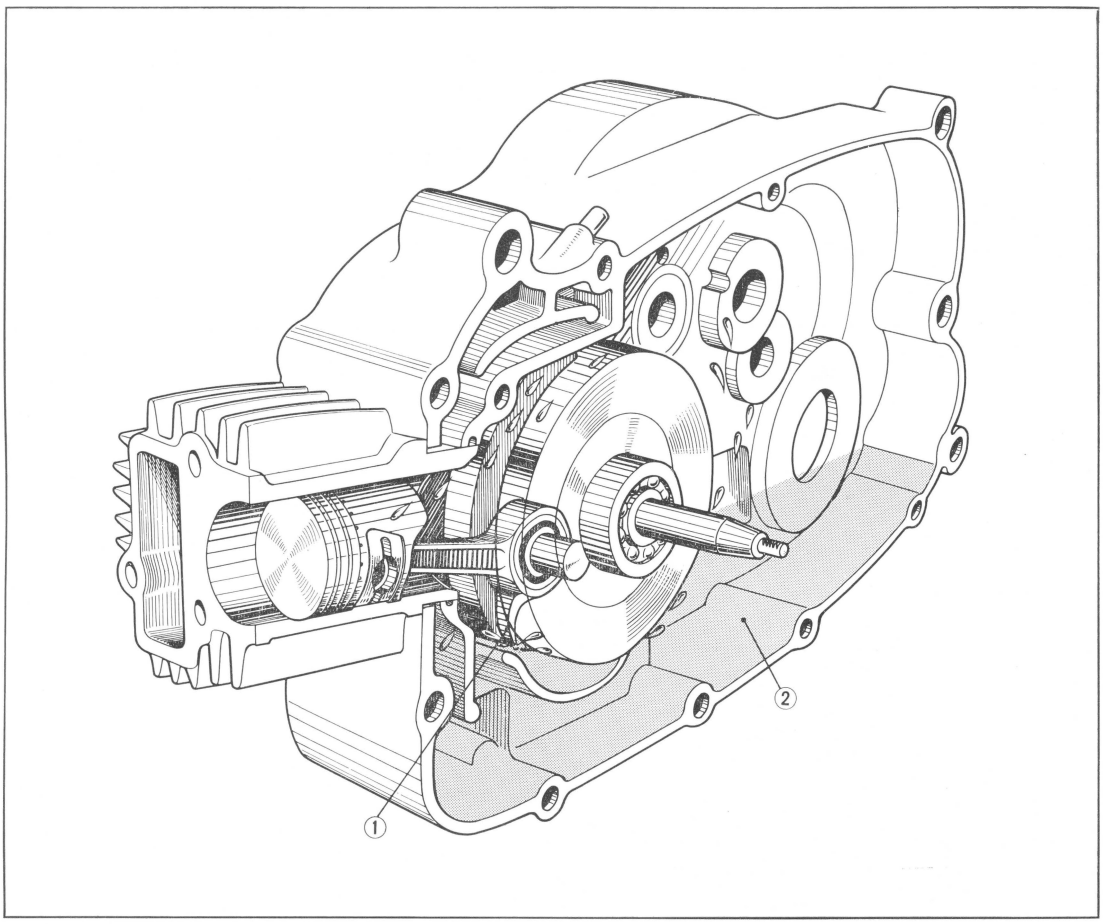


Fig. 3.73 Oil lubrication system

① Oill splasher ② Oil tray

Breather

The interior of the crankcase is continually under varying pressure, built up by the reciprocating piston, in addition, the crankcase is filled with gasses from the blowby of the piston and the gases produced by the heat of the crankcase. For this reason, the decomposition of the oil is hastened. Further it also increases the posibility of oil leaks at the case parting surfaces.

The breather is designed and incorporated in the case to exhaust the crankcase gases to the outside and also to maintain a constant pressure within the crankcase. To completely relieve the pressure from the oil, it is dissipated through the labyrinth. **(Fig. 3.74)**

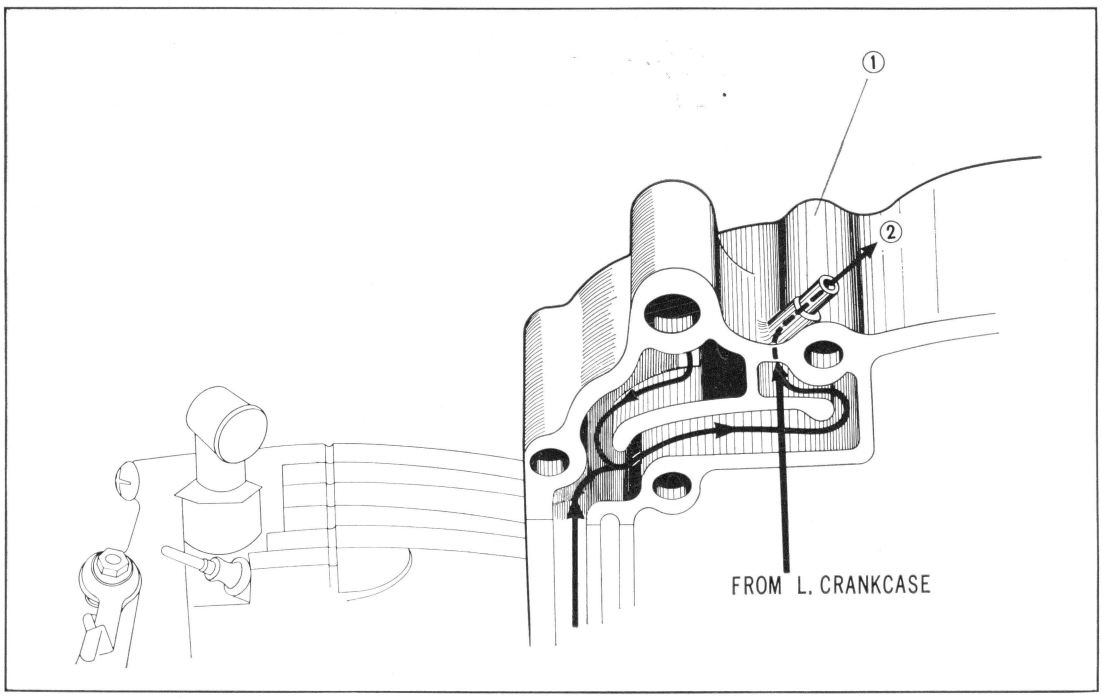


Fig. 3.74 Breather

① R. crankcase ② Dissipate the internal pressure to the outside

4. FRAME

(PC 50)

Frame Construction and Names of Parts

The power generated by the engine is transmitted to the rear wheel to produce the driving force. An ideal motorcycle should be one which is safe and easy for anyone to ride.

PC 50 is of a lightweight, strong, low frame type monocoque body construction which has been designed with ultimate in safety consideration. **(Fig. 4. 1)**

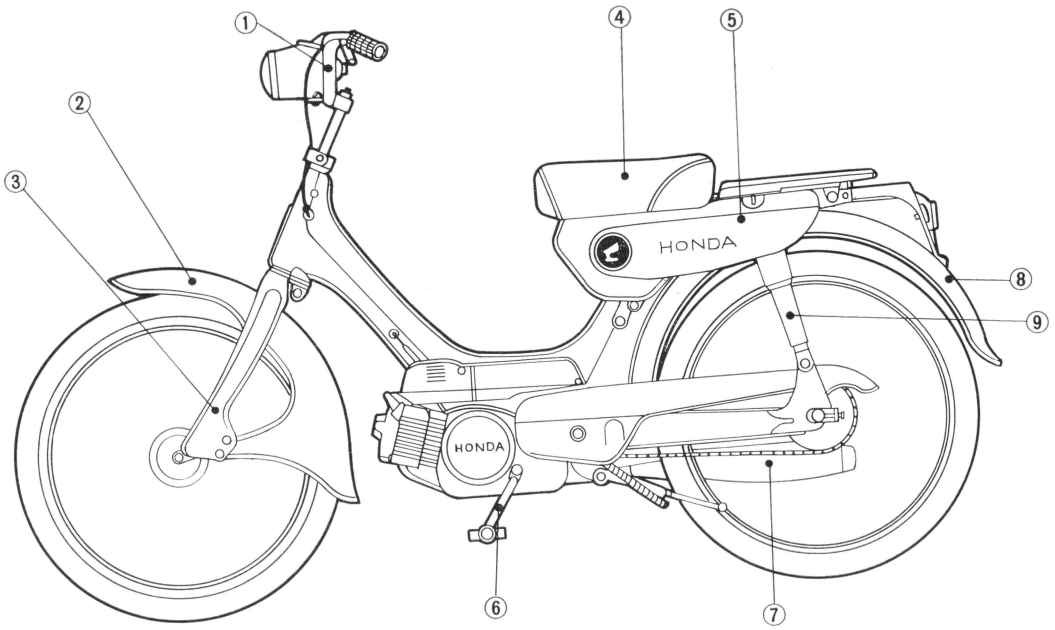


Fig. 4. 1

① Handle
② Front fender
③ Front fork
④ Saddle
⑤ Fuel tank
⑥ Crank arm
⑦ Exhaust pipe
⑧ Rear fender
⑨ Rear cushion

Tool Box

The tool box is located under the center of the seat. The spark plug axle nut wrench and the screw driver are included in case.

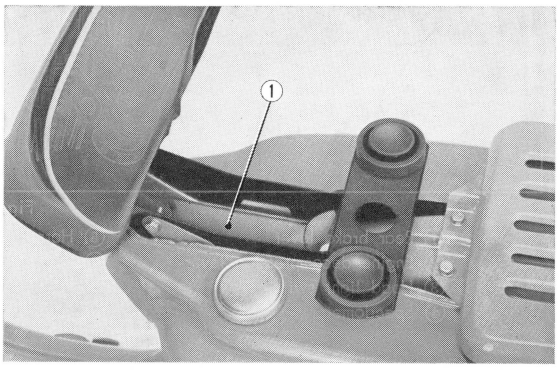


Fig. 4. 2

① Tool kit

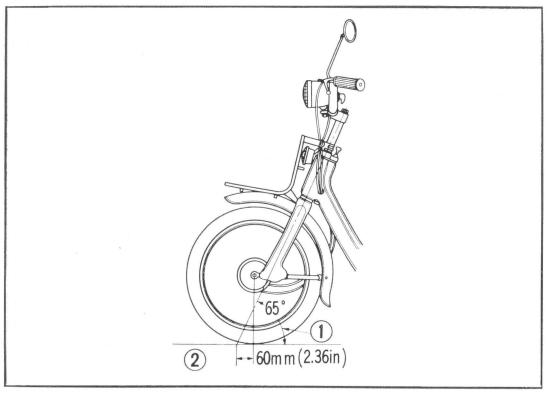


Fig. 4. 3
① Caster ② Trail

Steerability and Stability

The steerability and stability of a motorcycle depends upon the frame construction, the handle and saddle heights, and other factors, such as caster and trail which are also important.

Caster is the angle formed by the graund and the extension line of the frame head pipe. Trail is the distance measured on the ground between the vertical line passing the axle center and the extension line of the frame head pipe.

For PC 50, the caster is 65° and trail is 60 mm (2. 36 in) **(Fig. 4. 3)**

Steering Handle

The steering handle of PC 50 is identical to that of a bicycle in shape and method of mounting ; however, in addition, it is equipped with a throttle grip, front brake lever and a horn button on the right side and a rear brake lever and an engine decompression lever on the left side.

A head lamp incorporating a speedometer is mounted at the center, and adjustment of the beam can be made by loosening a nut. **(Fig. 4. 4)**

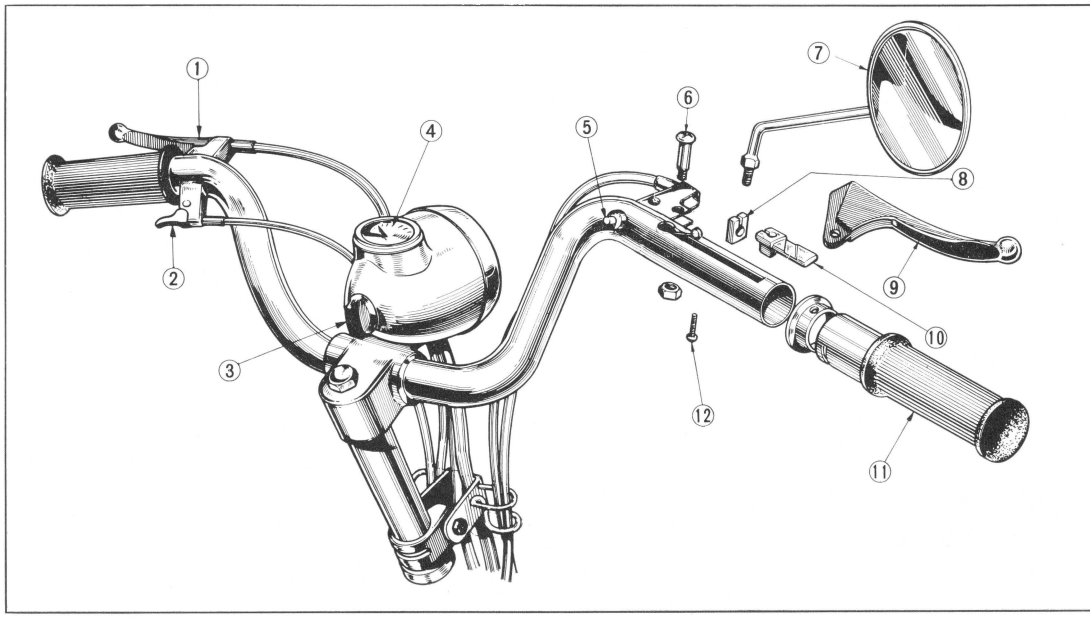


Fig. 4. 4

① Rear brake lever
② Engine decompression lever
③ Head light switch
④ Speedometer
⑤ Horn button switch
⑥ Handle lever pivot screw
⑦ Rear view mirror
⑧ Throttle cable outer holder
⑨ Front brake lever
⑩ Throttle cable hinge
⑪ Throttle grip
⑫ Throttle grip set screw

The steering handle is designed for easy riding with due consideration to the frame size and the saddle hight. (The handle can be adjusted to any height within the range marked with L.M.H. stamped on the handle) **(Fig. 4. 5)**

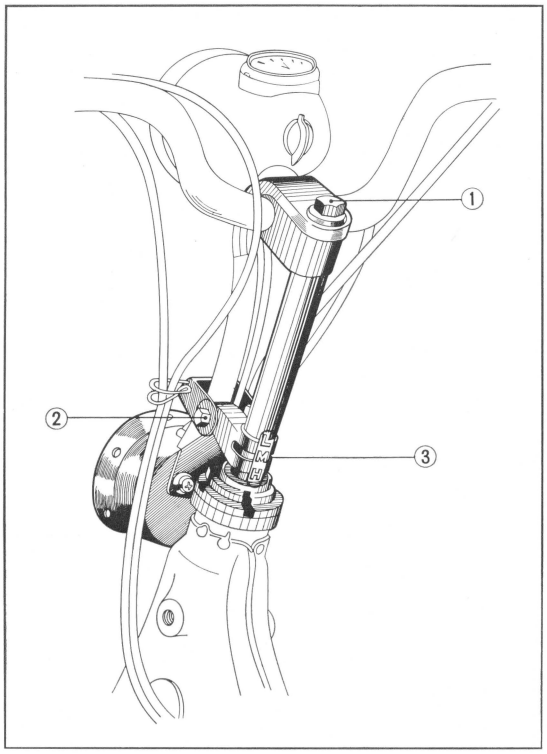


Fig. 4. 5 ① Handle setting bolt
② 6×40 mm hex bolt ③ Adjusting position

Front Fork

The front fork is mounted on the head pipe between steel balls.

The front cushion, incorporated the front fork, dampers and absorbs shocks from the front wheel. **(Fig. 4. 6)**

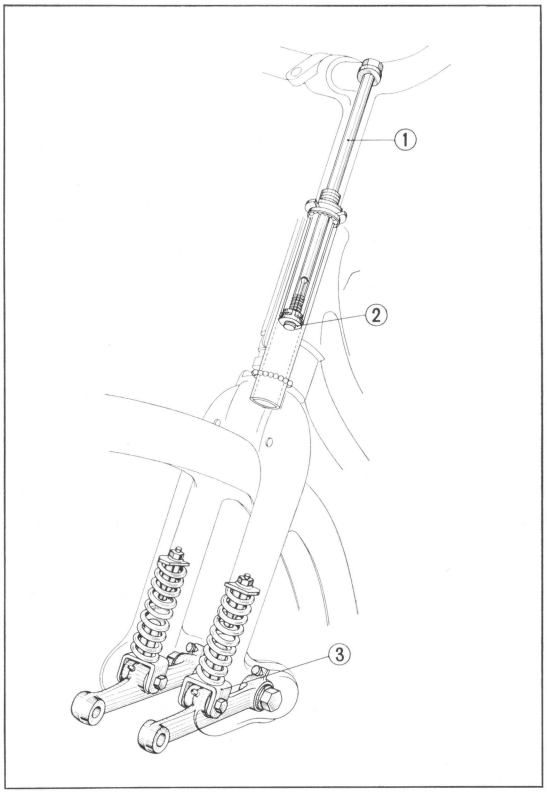


Fig. 4. 6 ① Handle set bolt
② Handle set nut ③ Front cushion

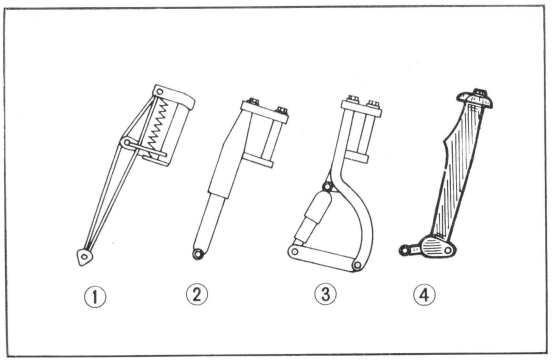


Fig. 4.7

① Pine-needle type
② Telescopic type
③ R's fork type
④ Bottom link type

Front Cushion

Even though the frame may be light and of construction to permit safe and good riding consideration, riding comfort will not be realized if the road shocks are transmitted from the wheels.

PC 50, with its bicycle-like lightweight frame construction, incorporates a cushion in the front frok for riding comfort.

Cushions are classified into various types according to their construction ; PC 50 has adopted a bottom link (leading link) type. **(Fig. 4. 7)**

The bottom link type construction ensures smooth operation, riding comfort and good steerability ; in addition, it allows wheel base to be practically unchanged.

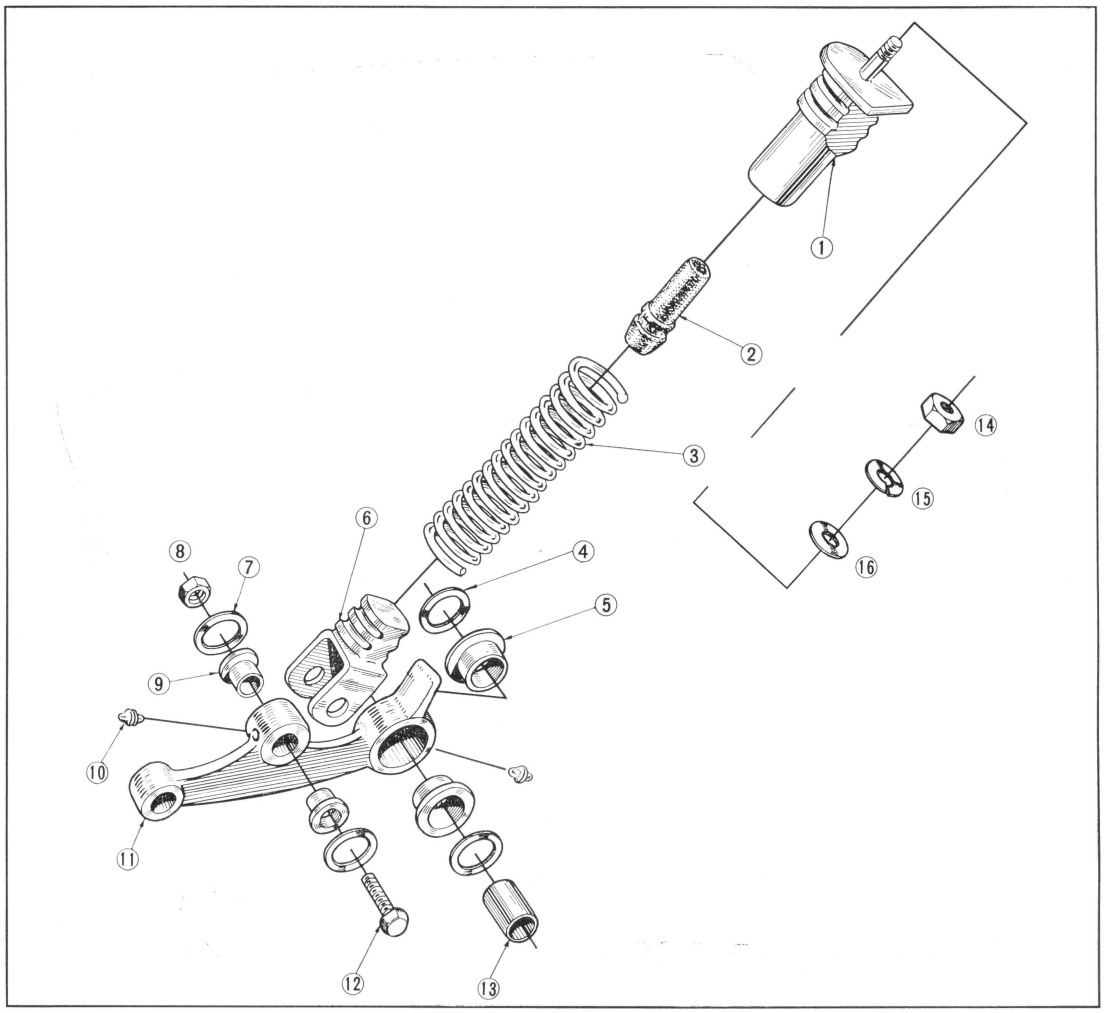


Fig. 4.8

① Front cushion upper metal
② Front cushion stopper rubber
③ Front cushion spring
④ Front arm pivot bush seal
⑤ Front arm pivot bushing
⑥ Front cushion lower metal
⑦ Front cushion under bush seal
⑧ 6 mm hex nut
⑨ Front cushion under bushing
⑩ 4.5 ϕ grease nipple
⑪ Front suspension arm
⑫ Front cushion under bolt
⑬ Front arm pivot collar
⑭ 6 mm hex nut
⑮ 6 mm spring washer
⑯ 6 mm flat washer

Rear Cushion

PC/PS 50 both have rear cushions to eliminate the shock from the wheel, similar to the function of the front cushion and improves the riding quality. **(Fig. 4. 9)**

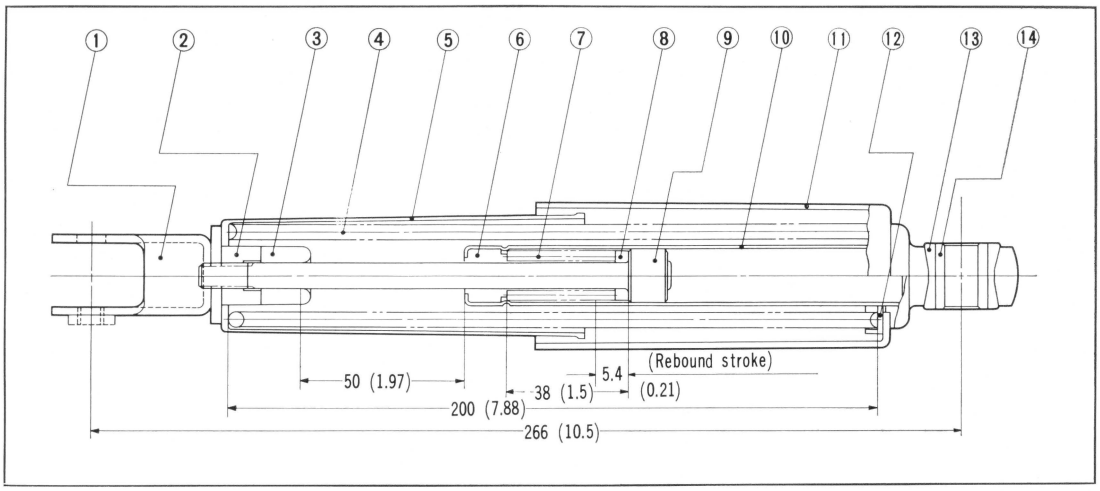


Fig. 4. 9

① Rear cushion bottom joint
② Rear cushion locking nut
③ Rear cushion stopper rubber
④ Rear cushion spring
⑤ Rear cushion bottom case
⑥ Rear cushion rod guide
⑦ Rear cushion rebound stopper spring
⑧ Rear cushion rebound spring seat
⑨ Rear cushion rod complete
⑩ Rear cushion upper metal
⑪ Rear cushion upper case
⑫ Rear cushion spring upper seat
⑬ Rear cushion upper rubber bushing
⑭ Rear cushion upper rubber collar

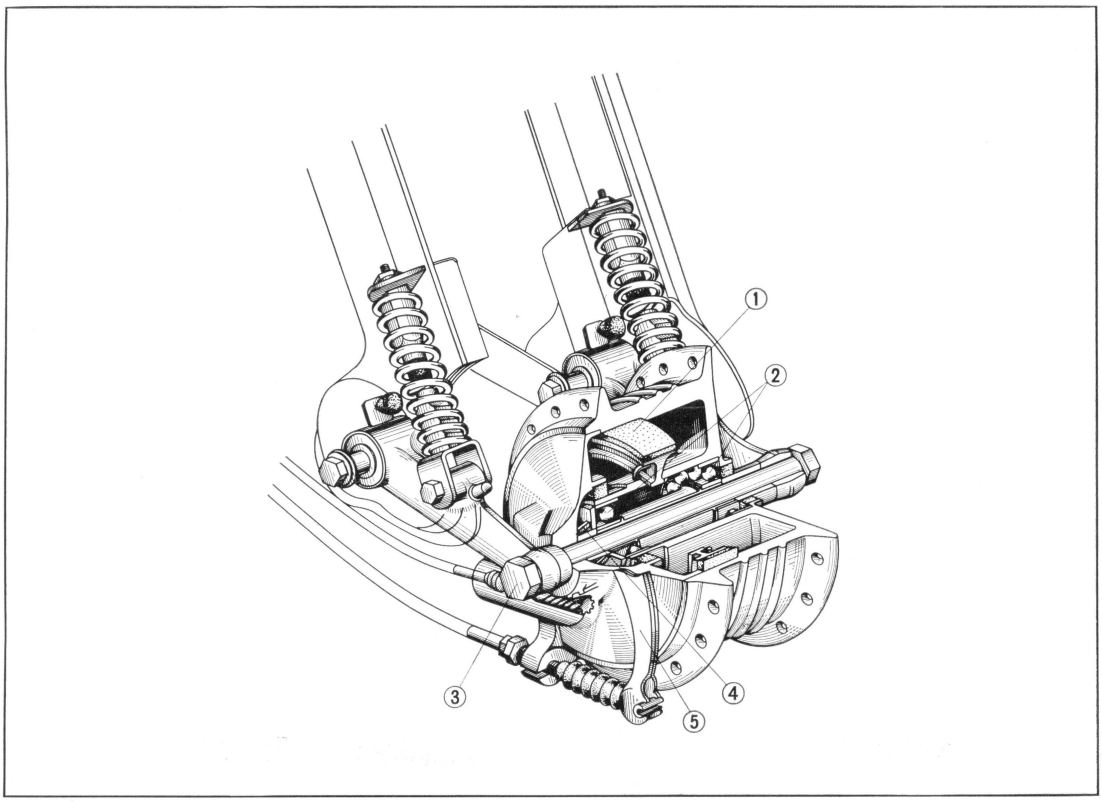


Fig. 4. 10

① Brake shoe
② 6201 ball bearing
③ Front wheel axle
④ Speedometer gear
⑤ Front brake arm

Front Wheel

Tire size 2.00-19-2 PR is used on the front wheel. The front axle supports the cast aluminum alloy hub mounted on two **6201** ball bearings.

The brake panel incorporates the speedometer gear box. Oil seals are incorporated in both the brake panel and the hub to prevent the entry of dust to assure longer life. **(Fig. 4. 10)**

Rear Wheel

The tire size used on the rear wheel is 2.25-19-2 PR. Rear axle is mouɵdnt on the rear wheel hub supported by two ball bearings, # 6201 and # 6201 R.

A dust seal is install to prevent entry of dust into the hub, further, a rear wheel damper is also incroporated for the smooth transmission of the power from the final driven sprocket. **(Fig. 4. 11)**

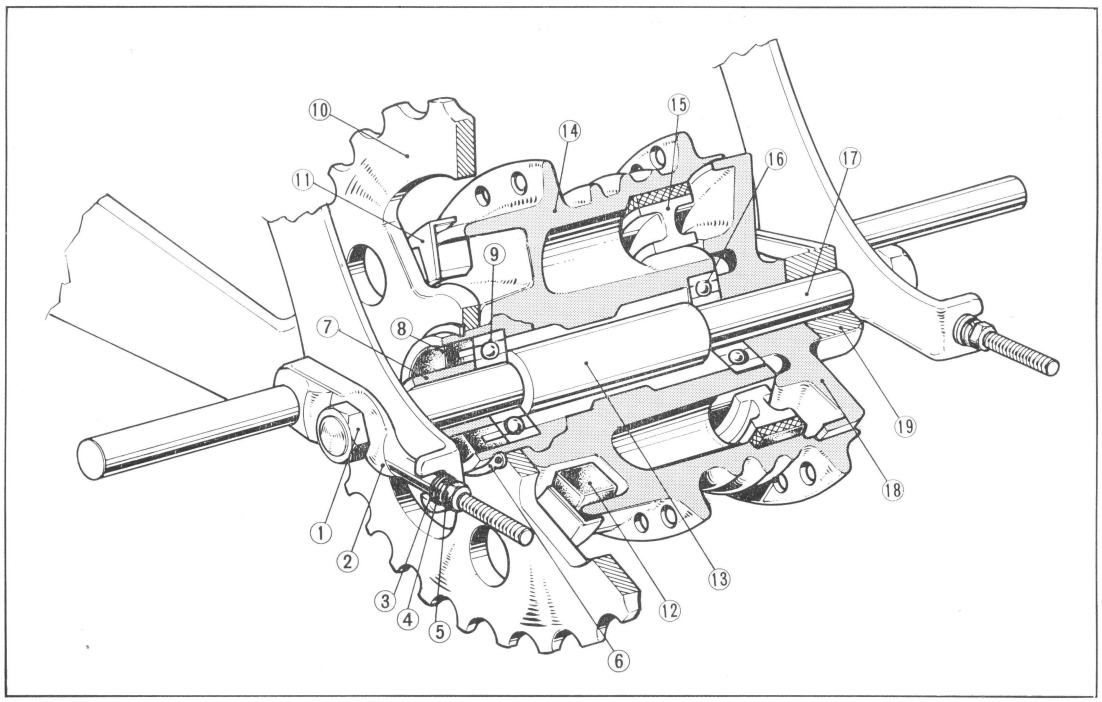


Fig. 4. 11

① 12 mm hex nut
② Drive chain adjuster
③ 6 mm plain washer
④ 6 mm spring washer
⑤ 6 mm hex nut
⑥ 38 mm circlip
⑦ Rear wheel side collar
⑧ Oil seal
⑨ 6201 ball bearing
⑩ Final driven sprocket
⑪ Rear wheel hub dust seal
⑫ Rear wheel damper
⑬ Rear axle distance collar
⑭ Rear wheel hub
⑮ Brake shoes
⑯ 6201 R ball bearing
⑰ Rear wheel axle
⑱ Rear brake panel
⑲ Rear brake panel side collar

Tire sizes are standardized by JIS (Japan Industrial Standard). For instance, 2.00–19–2 PR means that tire size is 2.00 inches, rim diameter 19 inches and two ply carcass. **(Fig. 4. 12)**

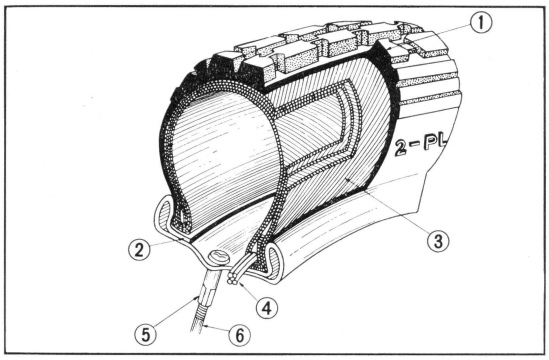


Fig. 4. 12 Tire construction
① Tread (A thick rubber layer. Design on the outside is called pattern.)
② Rim (A steel plate is rolled in and seam welded.)
③ Carcass (Cloth layers, 2PL for two ply)
④ Bead (Some piano wires are enclosed along the circumference.)
⑤ Spoke nipple
⑥ Spoke

Branke System

The brakes, both front and rear, are internal expanding types. The front is operated by the lever on the right handle and rear is operated by the lever on the left handle. The operation of the lever pulls the brake cable which being connected to the brake arm causes it to rotates and actuate the cam which expands the brake shoe against the lining in the hub.

A stop lamps which is mounted on the rear brake cable and whenever the cable is pulled, the switch is actuated to turn on stop light. The stop light switch requires no adjustment, the switch will engage to turn on the stop light when the lever is pulled by a definate amount. **(Fig. 4. 13)**

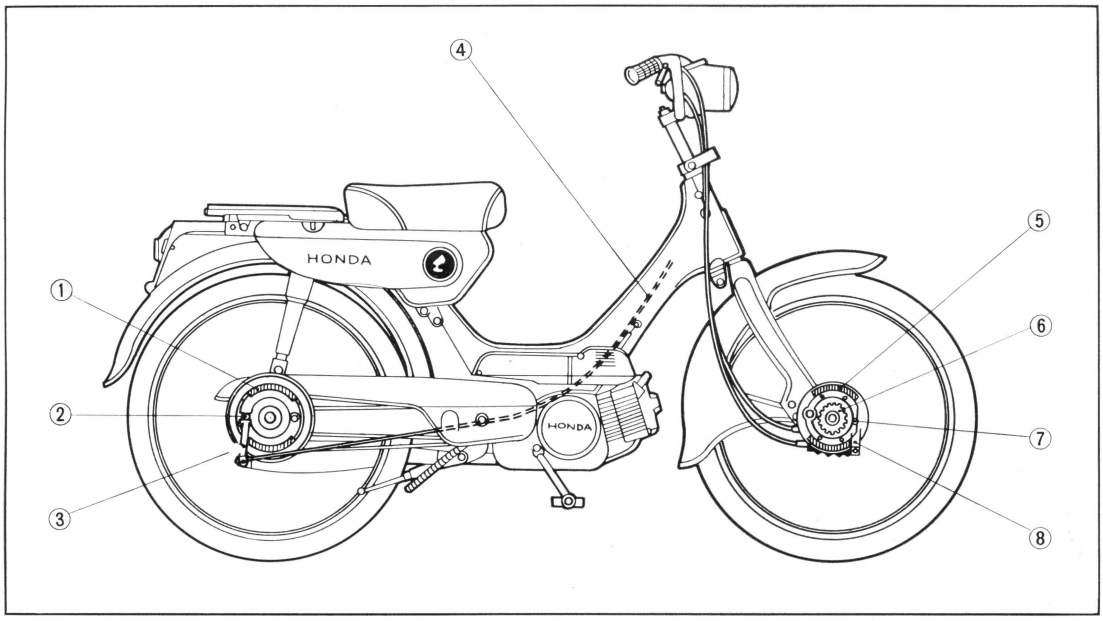


Fig. 4. 13 Braking system
① Rear brake shoe
② Brake cam
③ Brake arm
④ Rear brake cable
⑤ Front brake shoe
⑥ Speedometer gear
⑦ Brake cam
⑧ Brake arm

(PS 50)

Frame Construction and Names of Parts

The low frame has a low center of gravity, designed for easy riding or dismounting. Main member is made of pressed steel sheet halves, joined by welding to produce a rigid unit. **(Fig. 4. 14)**

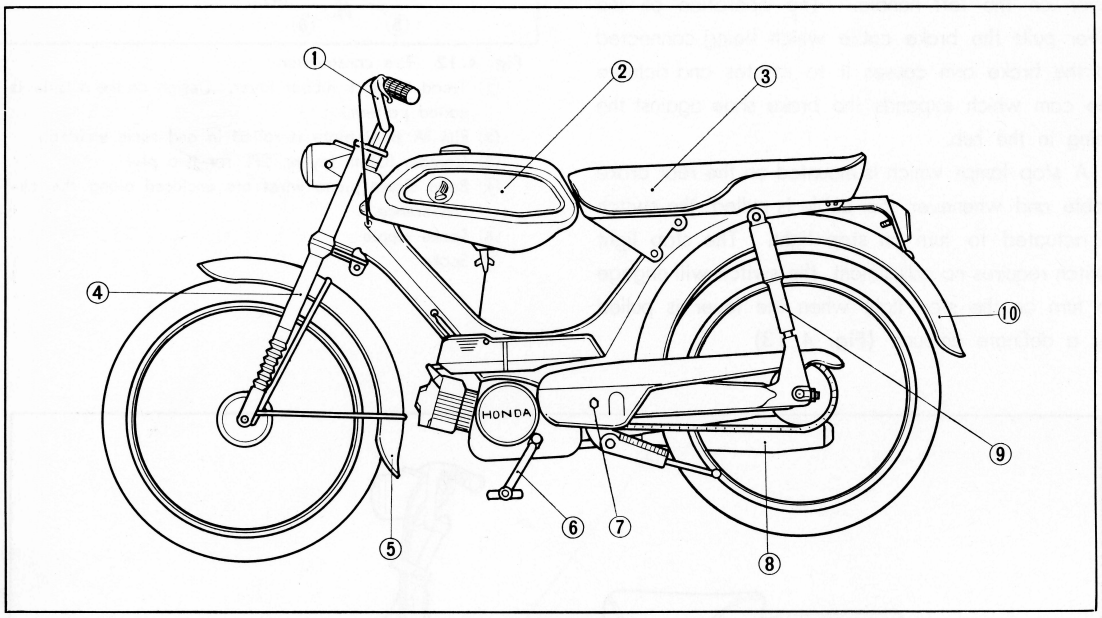


Fig. 4. 14

① Handle bar
② Fuel tank
③ Dual seat
④ Front cushion
⑤ Front fender
⑥ Crank arm
⑦ Chain case
⑧ Exhaust maffler
⑨ Rear cushion
⑩ Rear fender

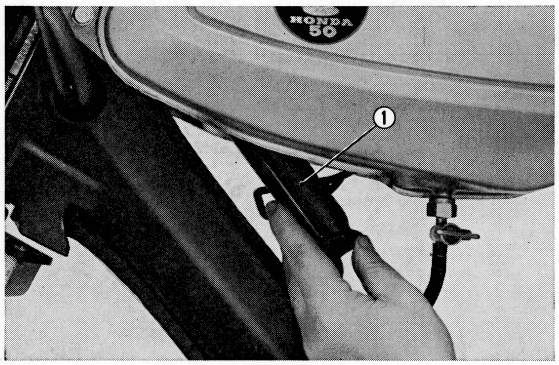


Fig. 4. 16
① Tool kit

Tool Box

The tool box is located under the center of the fuel tank. The spark plug axle nut wrench and the screwdriver are included in case. **(Fig. 4. 15)**

Handling and Stability

The steerability and stability of a motorcycle depends upon the frame construction, the handle and saddle heights, and other factors, such as caster and trail which are also important.

Caster is the angle fromed by the ground and the extension line of the frame head pipe. Trail is the distance measured on the ground between the vertical line passing the axle center and the extension line of the frame head pipe. The caster and the extension line of the frame head pipe.

The caster of the PS 50 is 64°30′, trail 50 mm (1.97 in) **(Fig. 4. 16)**

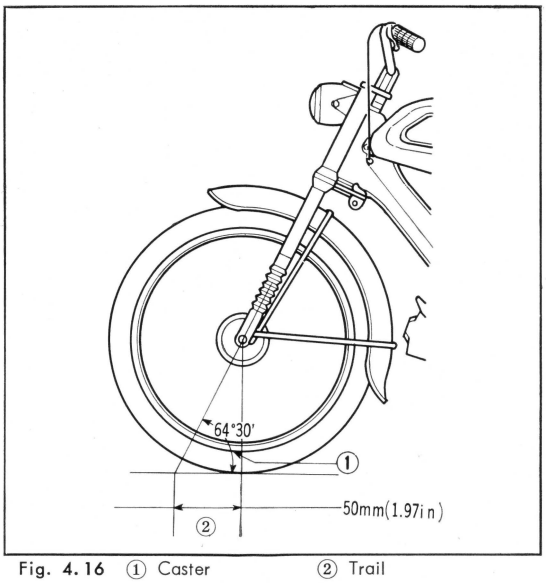


Fig. 4.16 ① Caster ② Trail

Steering Handle

The handle is inserted into the handle pipe holder which is mounted on the handle top holder base of the fork top bridge. The right handle contains the throttle grip, the front brake lever, and the left handle mounts the gear change grip, and the clutch lever .**(Fig. 4. 17)**

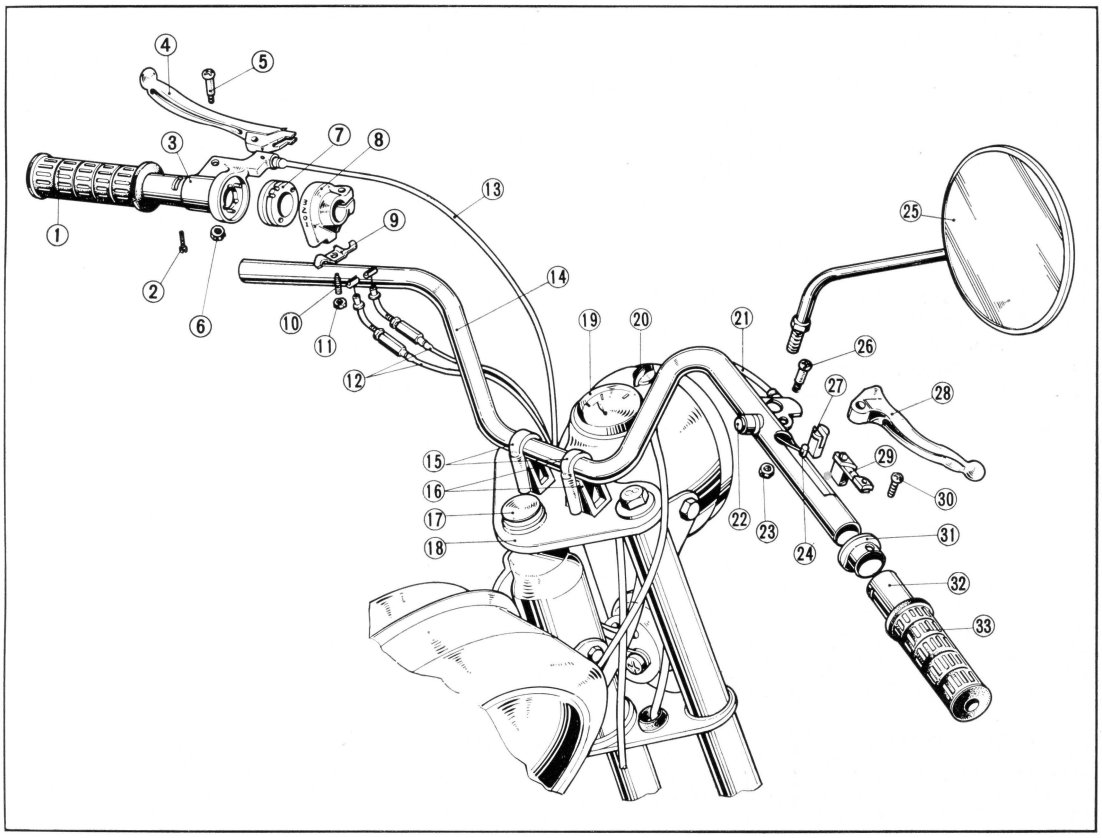


Fig. 4.17

① Left grip rubber
② 4×15 screw
③ Gear change grip left pipe
④ Clutch lever
⑤ Clutch lever pivot bolt
⑥ 6 mm hex nut
⑦ Gear change pulley
⑧ Gear change cable holder
⑨ Change wire clamp plate
⑩ Pulley stop screw
⑪ Pulley stop nut
⑫ Gear change cable
⑬ Clutch cable
⑭ Steering handle pipe
⑮ Handle pipe holder
⑯ Handle pipe holder base
⑰ Steering stem nut cap
⑱ Fork top bridge
⑲ Speedometer
⑳ Lighting switch
㉑ Front brake cable
㉒ Horn button
㉓ 5 mm hex nut
㉔ Throttle cable
㉕ Rear view mirror
㉖ Front brake lever pivot screw
㉗ Throttle cable outer holder
㉘ Front brake lever
㉙ Throttle cable hinge
㉚ Throttle grip set screw
㉛ Throttle grip stopper
㉜ Throttle grip pipe
㉝ Right grip rubber

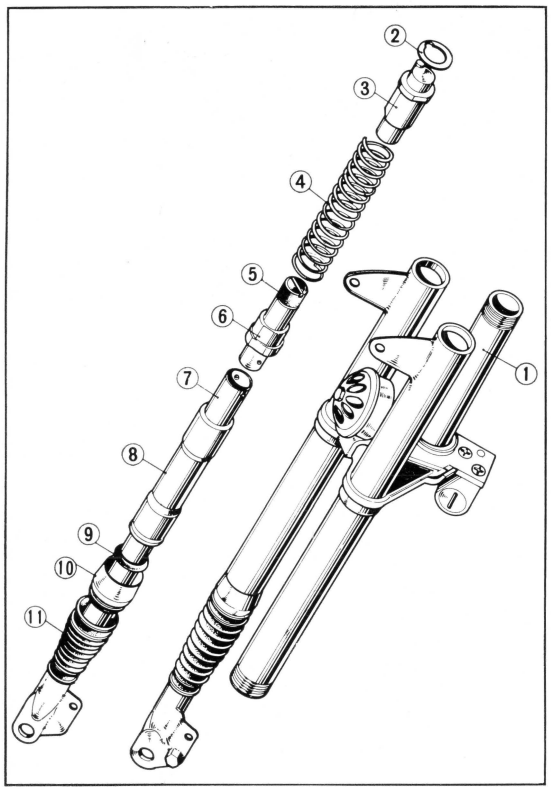


Fig. 4. 18

① Front fork
② Seat washer
③ Cushion spring upper holder
④ Front cushion spring
⑤ Front cushion stopper rubber
⑥ Cushion spring under holder
⑦ Front fork half slide pipe
⑧ Fork pipe guide
⑨ Oil seal
⑩ Front fork pipe guide cap
⑪ Front fork boot

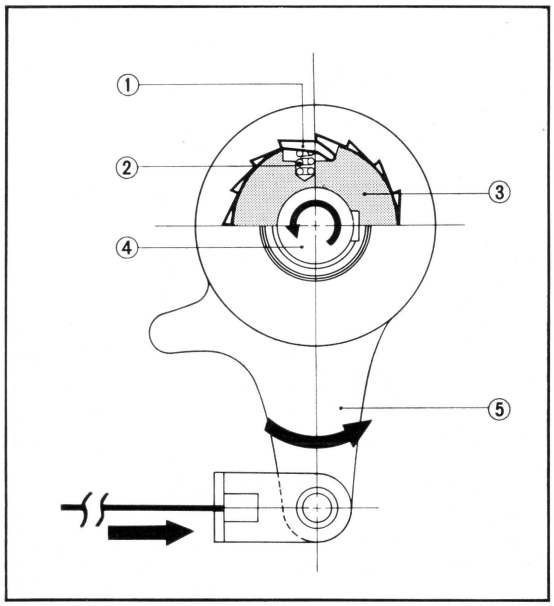


Fig. 4. 19

① Ratchet pawl
② Ratchet spring
③ Brake lever shaft
④ Pedal shaft
⑤ Brake lever

Front Cushion

Even though the frame may be light and of construction to permit safe and good riding consideration, riding comfort will not be realized if the road shocks are transmitted from the wheels.

The PS 50 utilizes the telescopic type the front fork consists of right and left steel tube joined at the top by the bottom bridge. Front wheel is supported by the suspension springs contained within the fork tubes to provide the telescopic suspension action. **(Fig. 4. 18)**

Front Wheel

The front wheel is identical to those used for the PC 50, therefore, refer to page 56.

Rear Wheel

The rear wheel is idntical to those used for the PC 50, therefore, refer to page 56.

Brake System

The brakes, both front and rear, are internal expanding types. The front is operated by the lever on the right handle. The operation of the lever pulls the brake cable which being connected to the brake arm causes it to rotates and actuate the cam which expands the brake shoe aginst the lining in the hub.

The rear brake is operated by reversing the cycling pedal. When the cycling pedal is reversed, the pedal shaft turn in the direction indicate by the arrow, further, brake lever shaft which is mounted to the pedal shaft with a key also rotates together, and the ratchet pawl mounted on the brake lever shaft, engages with the brake lever ratchet and rotates in the direction indicated by the arrow. When the brake is pedaled in the normal manner (for starting or pedaling) the ratchet pawl does not engage with brake lever and therefore does not rotated. **(Fig. 4. 19)**

5. ELECTRICAL EQUIPMENT

(PC/PS 50)

The electrical equipment used on PC/PS 50 not only generates good sparks by the AC generator but also includes many safety components for the safety of the rider. In addition, turn signal lamps are available as optional parts. They are very simple to install. **(Fig. 5. 1)**

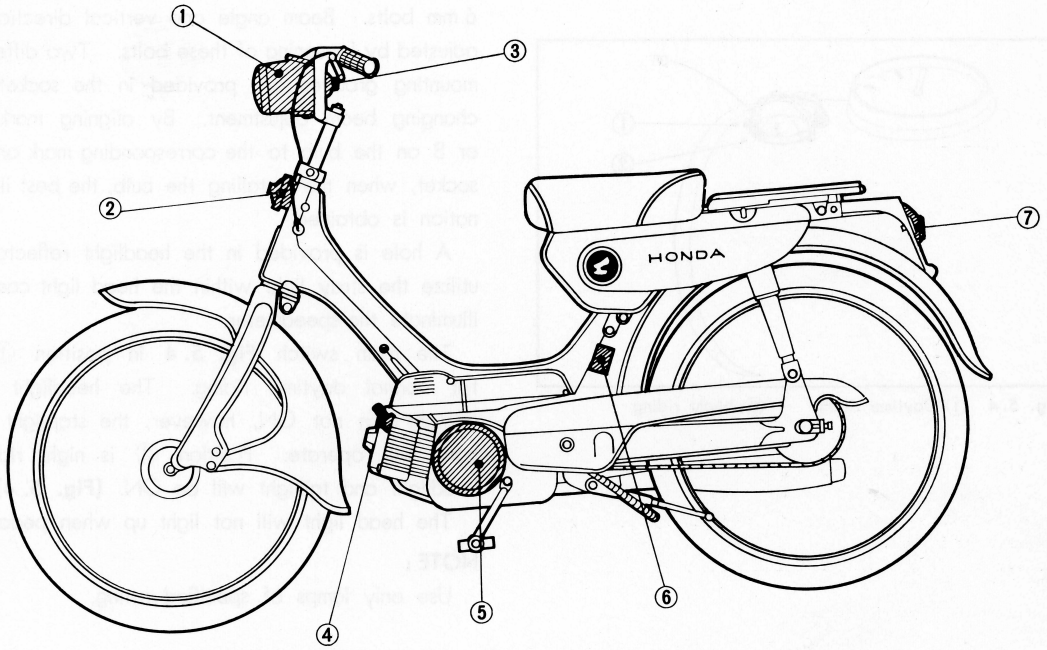


Fig. 5. 1 Installed locations of electrical parts (PC 50)

① Head light
② Horn
③ Lighting switch
④ Spark plug
⑤ Flywheel AC generator
⑥ Ignition coil
⑦ Tail stoplight

(PC 50)

The head light is mounted at the center of the handle bar and adjustment of the beam angle is made by loosening the head light case fixing nut.

Two different mounting grooves are provided in the socket for changing the beam adjustment. By aligning the mark (A or B) on the bulb to the corresponding mark on the socket, when installing the bulb, the best illumination is obtained. **(Fig. 5. 2)**

A hole is provided in the head lignt reflector to

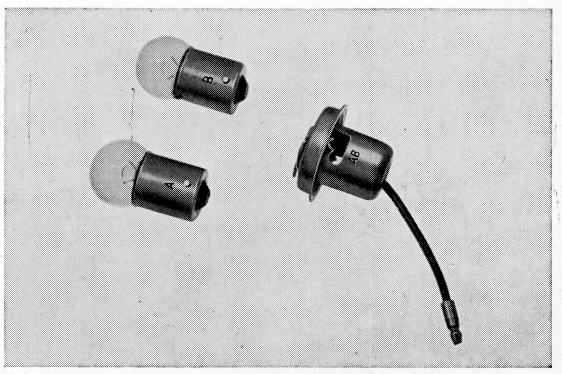


Fig. 5. 2 Headlight bulbs

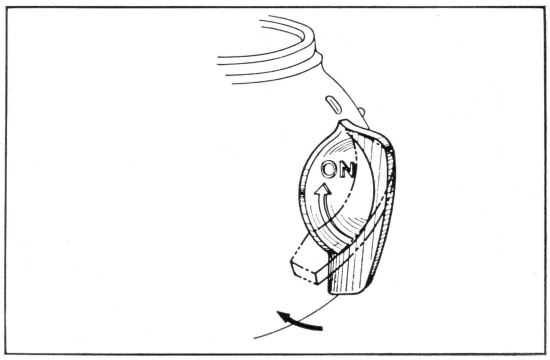


Fig. 5.3 Lighting switch

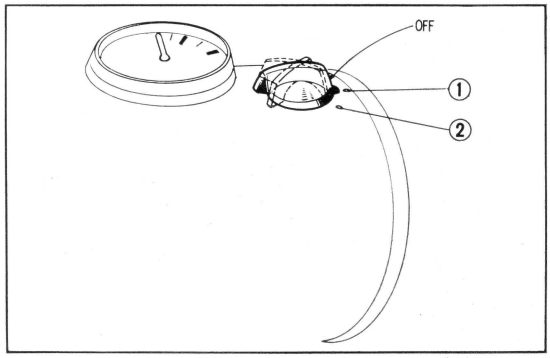


Fig. 5.4 ① Daytime riding ② Night riding

utilize the stray light within the head light case to illuminate the speedometer.

When the lighting switch is positioned "ON", the head light as well as the tail lamp light up and simultaneously the stop lamp and the horn are switched to night circuit in order to obtain the same brightness for the stop lamp and the sound for the same horn as for daytime,

(PS 50)

The headlight is mounted on the front fork with 6 mm bolts. Beam angle and vertical direction is adjusted by loosening of these bolts. Two different mounting grooves are provided in the socket for changing beam adjustment. By aligning marks A or B on the bulb to the corresponding mark on the socket, when the installing the bulb, the best illumination is obtained.

A hole is provided in the headlight reflector to utilize the stray light within the head light case to illuminate the speedmeter.

The main switch **Fig. 5.4** in position ① is for normal daytime riding. The headlight and taillight are not ON, however, the stoplight and horn will operate. Position ② is night riding; headlight and taillight will be ON. **(Fig. 5.4)**

The head light will not light up when pedaling.

NOTE:

Use only lamps of specified rating.

Destination	Headlight bulb	Taillight bulb	Stoplight bulb
• General export	6 V–10 W	6 V–2 W	6 V–6 W
• France, Belgium	6 V–6 W	6 V–1.8 W	6 V–5 W
• England	6 V–10 W	6 V–5 W	6 V–18 W
• Holland	6 V–6 W	6 V–1.8 W	——

MAIN TENANCE AND REPAIR

1. INSPECTION AND ADJUSTMENT

In order to maintain the vehicle in safe and best operating condition, inspections and adjustments should be properly performed.

There are two types of inspection, namely, the daily inspection which is performed by the owner before starting the engine and the periodic inspection which is performed by the dealer in accordance with the established schedule.

1. DAILY INSPECTION

In performing the daily inspection, ask yourself the following questions and then check those specific items to assure that the conditions are satisfactory.

1. Is the engine oil level correct ? Check with the dipstick. Specified volume 0.8 lit (1.7 U.S. pt, 1.4 Imp. pt.) [PS 50 : 0.9 lit (1.9 U.S. pt., 1.6 Imp. pt.)]
2. Is there sufficient fuel for the trip ? Tank cappacity 3.0 lit. (0.8 U.S. gal., 0.7 Imp. gal.) [PS 50 : 5.5 lit. (1.5 U.S. gal., 1.2 Imp. gal.)]
3. Is the play of the front branke lever normal ? It should be 10～15 mm (0.4～0.6 in) at the end of the lever.
4. Is the play of the rear branke lever normal ? It should be 10～15 mm (0.4～0.6 in) at the end of the lever.
5. Are all the main components properly fastend ?
6. Do the head, tail and stop lights operate ?
7. Does the horn have the proper loudness ?
8. Is the rear view mirror positioned correctly ?
9. Is the front tire air pressure normal ? 1.3 kg/cm^2 (18.5 lbs/in^2) standard
10. It the rear tire air pressure normal ? 1.7 kg/cm^2 (24 lbs/in^2) standard

2. PERIODIC INSPECTION

The schedule of periodic inspection and adjustment for the various components are shown in the following Table.

Speedometer reading mile (km) / Item	300 (500)	1,000 (1,600)	2,000 (3,200)	3,000 (4,800)	4,000 (6,400)	5,000 (8,000)	6,000 (9,600)
Change engine oil	◆	◆	◆	◆	◆	◆	◆
Adjust throttle cable		◆	◆	◆	◆	◆	◆
Adjust decompression cable (PC 50)						◆	
Adjust gear change cable (PS 50)						◆	
Adjust brakes		◆	◆	◆	◆		◆
Clean air cleaner				◆			◆
Greasing				◆			◆
Adjust drive chain		◆	◆	◆	◆	◆	◆
Adjust valve clearance				◆			◆
Adjust ignition timing				◆			◆
Adjust carburetor		◆		◆			◆
Clean spark plug				◆			◆

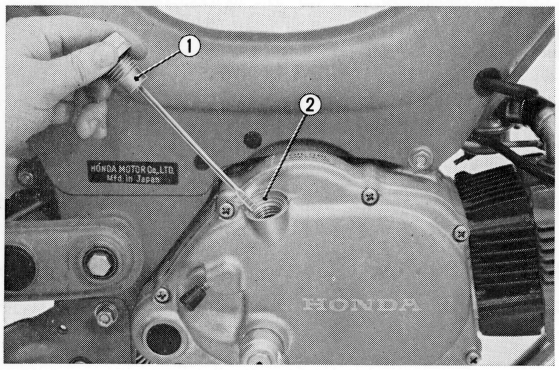


Fig. 1.1
① Oil level gauge ② Oil filler opening

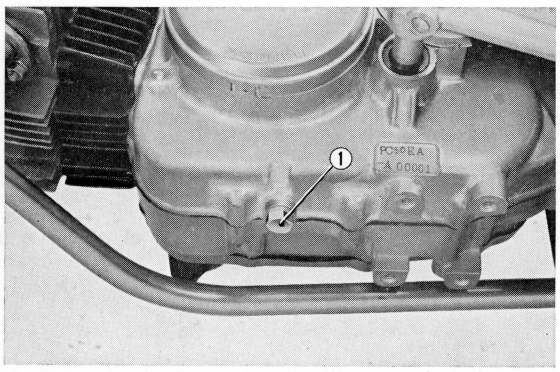


Fig. 1.2
① Drain plug

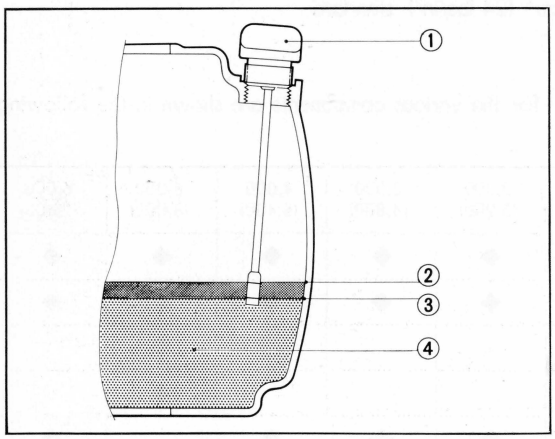


Fig. 1.3
① Oil level gauge ③ Minimum oil level
② Maximum oil level ④ Oil

A. Lubrication

Lubricant is required on the rotating or sliding surfaces of the moving parts to prevent wear and possible seizure due to the heat produced by the friction. The function of the lubricant is to provide a thin film of oil between the surfaces so that there are no direct surface to surface contact. This will prevent wear and friction, thus, minimizing the possibility of heat generation. Insufficient lubricating oil or prolonged use of dirty oil will not only reduce the service life of the mechanical components but also adversely affect the performance of the motorcycle.

1. Changing and Replenishing Engine Oil

1. Remove the oil level gauge and unscrew the drain plug at the bottom of the crankcase and drain the engine oil completely.

   Engine oil will drain more quickly and thoroughly if the engine is still warm.
2. Reinstall tne drain plug securely and refill the crankcase with new engine oil. **(Fig. 1.1, 2)**

   If the engine had been overhauled, fill the crankcase with 0.8 *l* of oil (1.7 US pt., 1.4 Imp. pt.) [PS 50 : 0.9 *l* (1.9 US pt., 1.6 Imp., pt.)], however, during oil changes or replenishments, refill according to the oil level gauge. The crankcase should be filled with oil up to the upper level mark on the gauge. Proper oil checking procedure is not to screw the cap into the crankcase.

OIL

Oil of poor quality may adversely affect the engine performance as well as its life. **(Fig. 1.3, 4)**

The grade 10W-30m ay be use in all seasons regardless of temperature.

2. **Parts which Require Lubricating with Oil**
   Crank pedal **(Fig. 1. 5)**
   Drive chain

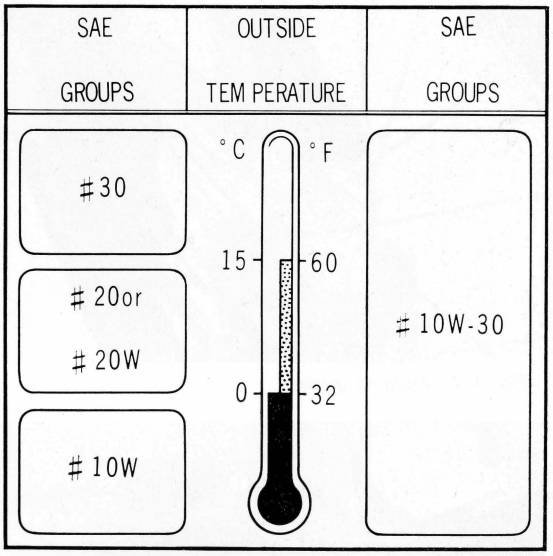


Fig. 1. 4

3. **Greasing**

Parts which require lubricating with grease.

Apply grease to grease nipples with grease gun. **(Fig. 1. 6, 7)**

Parts not requiring periodic oil change or lubrication.

There are some parts which do not require regular lubrication, they are only lubricated whenever the parts are dissembled for repair or replacement, or when overhauled. These parts are :

Throttle grip.
Bottom ball race
Top ball race
Front and rear wheel bearings

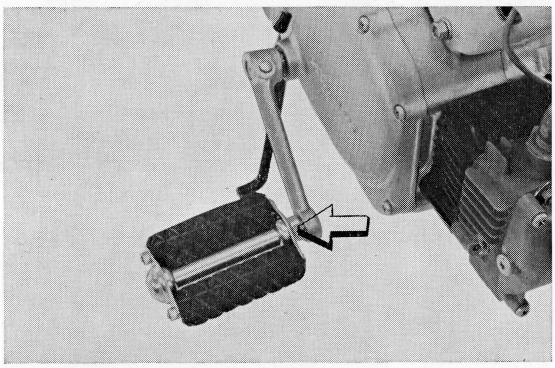


Fig. 1. 5 Lubricating oil

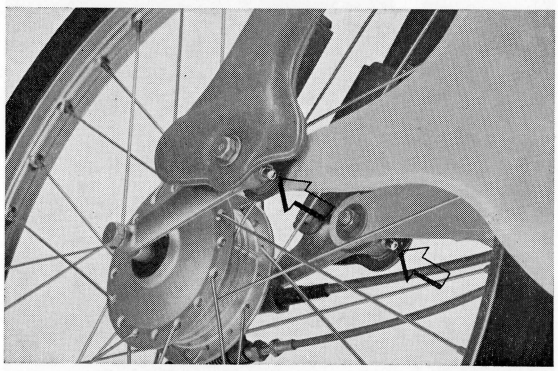


Fig. 1. 6 Applying grease

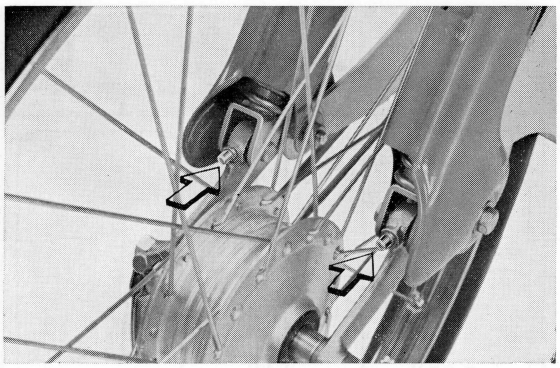


Fig. 1.7 Applying grease

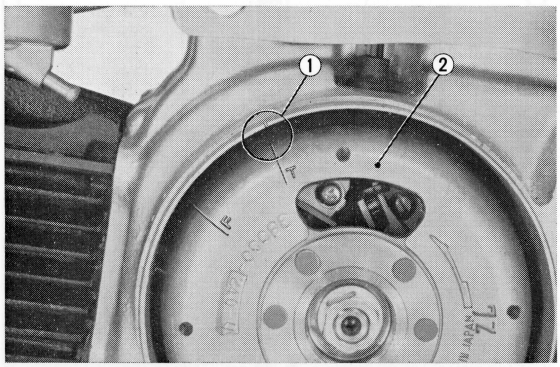


Fig. 1.8 ① Timing index mark ② Flywheel

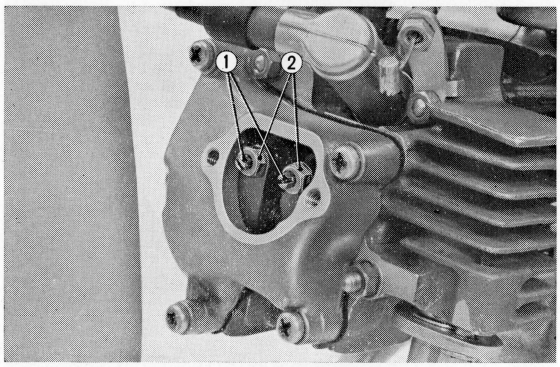


Fig. 1.9 ① Tappet adjusting screw
② Cock nut

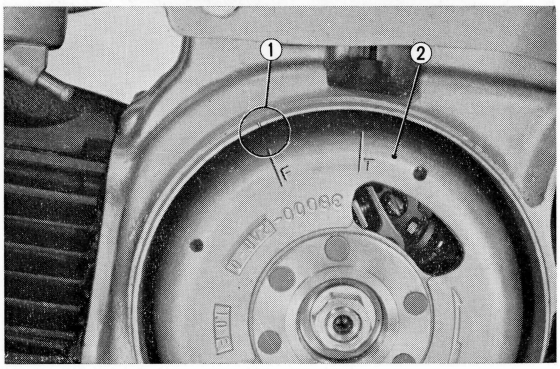


Fig. 1.10 ① Timing index mark ② Flywheel

B. Engine

1. Tappet Clearance Adjustment

The tappet clearance will have a great deal of effect on the valve timing. Further, if the clearance is too small, it may prevent the valve from fully closing and result in pressure leak at the valve. On the other hand, an excessive tappet clearance will produce tappet noise, causing noisy engine operation. The tappet clearance will also have a varying degree of effect on the engine power output and engine operation.

1. Remove the dynamo cover and align the timing mark "T" on the flywheel with the timing index mark on the crankase. **(Fig. 1. 8)**
2. Remove the tappet adjusting cap on the cylinder head and check the clearance between the adjusting screw and the valve. If the valve is actuated by the screw, rotate the flywheel one complete revolution and realign the timing marks to set the piston at top-dead-center of the compression stroke. Check the tappet clearance with a thickness gauge to see if it is of standard clearance of **0.05 mm (0.002 in)**. if adjustment is necessary, loosen the adjusting screw lock nut and make the adjustment with the adjusting screw. Both the inlet and exhaust valves should be set to the same clearance. Lock the adjusting screw after the adjustment has been completed. **(Fig. 1. 9)**

NOTE :

1. The adjustment must be made with a cold engine.
2. When tightening the adjusting screw lock nut, hold the screw to pevent its turing.

2. Ingnition Timing Adjustment

An improper ignition timing, regardless of the accuracy of the valve timing or the proper compression pressure, will not produce a satisfactory engine performance. Ignition timing out of adjustment will seriously affect engine power output as well as resulting in engine overheating and causing backfires.

Check the ignition timing in the following manner.

1. Remove the dynamo cover and align the "F" mark on the flywheel with the timing index mark on the crankcase. In this position, check to make sure that the contact points are just about to open. **(Fig. 1. 10)**

Valve timing		
IN	Open	(BTDC) 5°
	Close	(ABDC) 10°
EX	Open	(BBDC) 10°
	Close	(ATDC) 5°

This check can be performed by connecting one of the timing tester leads to the black lead from the engine and the other lead to the engine ground. With this hook-up, rotate the flywheel and adjust the breaker assembly so that the tester lamp will light up when the "F" mark on the flywheel is aligned to the timing index mark on the crankcase.

Adjust the breaker points by loosening the breaker plate lock screw and moving the breaker plate with a screwdriver. **(Fig. 1.11)**

2. Normal breaker point gap should be 0.3~0.4 mm (0.012~0.016 in)

NOTE :

1. Inspect the breaker point contact surface. Burnt or pitted contact point surfaces will cause poor ignition. If necessary, dress the surfaces with an oilstone so that the points are making good contact.
2. If the point surfaces are stained with oil :
   a. The surfaces will darken and result in excessive wear.
   b. Oil traces, if left unremoved for a long time, will harden and form insulation coating over the point surfaces, causing ignition failure.
3. The contact breaker point gap may change slightly when the screw is tightened, therefore, recheck after making the adjustment to assure that the gap setting has not been disturbed.

3. Spark Plug Inspection

The condition of a spark plug is an indicator of engine performance. A dirty or damaged spark plug, or plug electorde which is eroded, will not produce a good strong spark, therefore, the spark plug should be inspected periodically for cleaning and adjustments.

Spark plugs with sooty, wet electrodes or electrodes covered with deposits will permit the high tension voltage to bridge over the gap without sparking, therefore, spark plugs should be cleaned to be free of foreign objects.

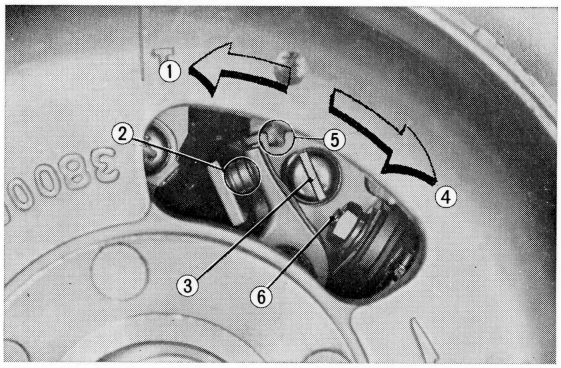


Fig. 1.11

① To advance
② Breaker point
③ Lock screw
④ To retard
⑤ Screw driver adjusting slot
⑥ Breaker plate

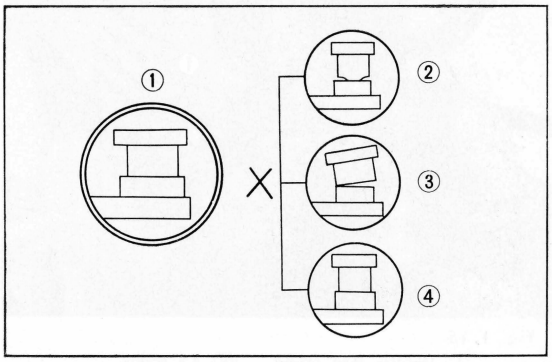


Fig. 1.12

① Normal
② Worn contact points
③ Side contacting
④ Dirty contact points

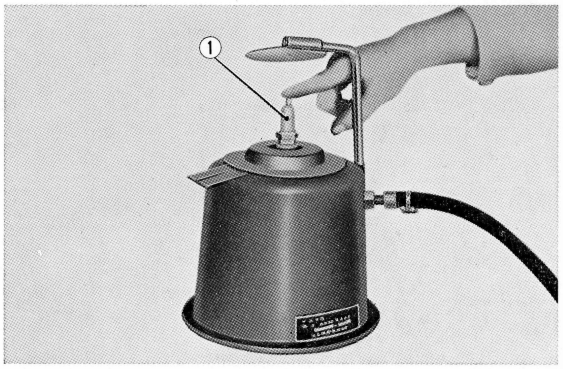


Fig. 1.13

① Spark plug

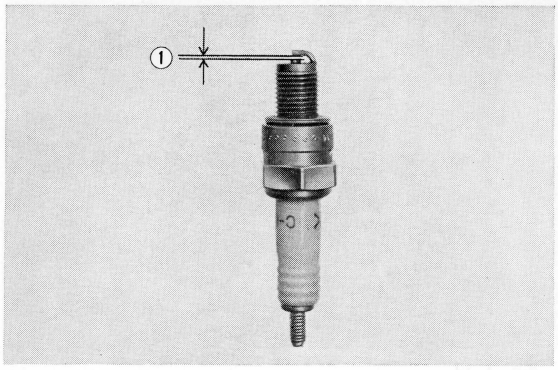


Fig. 1.14 Spark plug gap

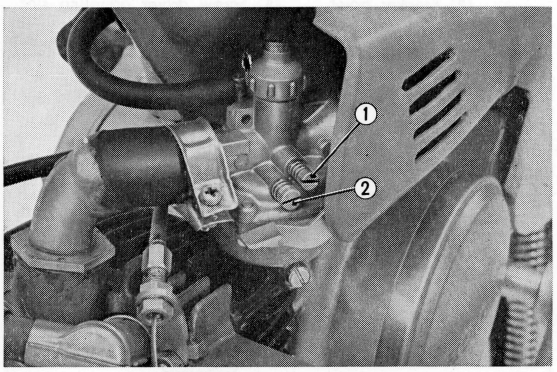


Fig. 1.15
① Throttle stop screw ② Air screw

1. The use of a spark plug cleaner is the recommended method of cleaning the plugs, however, a satisfactory cleaning can be performed by using a needle or a stiff wire to remove the deposits and then wash in gasoline followed by drying with a rag.
2. Adjust the spark gap after cleaning.
   The correct spark gap **0.6～0.7 mm (0.024～0.028 in)**
   The standard spark plug **C-6HB**

NOTE :

1. Do not remove the deposists by burning.
2. When installing the spark plug, install finger tight before torquing with a plug wrench.
3. The spark plug electrodes will wear as a result of long use, causing a wide spark gap and will result in lowering the sparking performance. Therefore, pericdic inspections should be made.

4. Carburetor Adjustments

A dirty carburetor or carburetor out of adjustment will cause poor engine performance. As an example, a carburetor set to a lean air-fuel mixture will cause the engine to overheat, while a rich mixture will cause engine to run sluggish. An overflowing of fuel from the carburetor is a possible fire hazard. Carburetor should be cleaned and adjust periodically.

1. Set the throttle stop screw gradually to the lowest idling speed.
2. Next, adjust the air screw by turning slowly in both directions to obtain the highest engine speed.
3. Reduce the engine speed which has gone up in (2) to the lowest idiling speed by regulating the throttle stop screw.
4. At this throttle stop screw setting, recheck the carburetor adjustment by manipulating the air screw. **(Fig. 1.15)**

NOTE :

1. All adjustment should be made after the engine has attained operating temperature.
2. Poor engine performance may occasionally be caused by troubles in the ignition or valve system. Therefore, when trying to locate an engine trouble, attention should be given to not only carburetor adjustment but also to the other systems.

3. Lead tetrachloride or other foreign substance contained in fuel will collect in the float chamber and if not cleaned periodically, will result in restriction to the fuel flow, causing poor engine performance. It is recommended that carburetor be cleaned monthly.

Fuel Level Adjustment

As shown in the figure, the fuel level is determined by the height of the float arm "h".

The foat adjustment procedure is described below with the figure. In contrast to the existing type float, the float and float arm are separated. Remove the float and set the carburetor vertically on end at this time, take measurement of the float arm bottom end and the height of the carburetor body, and determine the difference in height "h". **(Fig. 1. 16)**

When making the measurement with the gauge, the range of adjustment is plus or minus 1 mm (0. 040 in) from the point of contact between float arm and the float valve.

If adjustment is necessary, bend the lip of the float arm. Raising the the lip will lower the fuel level and visa versa. A spring is incorporated into the base of the float valve to prevent the valve from oscillating; this spring will recede when pressed, therefore, when making the adjustment, the point where the float arm comes in contact with the valve must be carefully observed.

Proper fuel level will be obtained if the adjustment is made correctly.

NOTE :

After completing the adjustment, make sure that the float valve is functioning properly. The float valve must be assured full opening when the float is resting on the stopper, there should be a clearance of at least 1 mm (0.040 in) at the float valve.

Further, the float arm gauge must conform equally will in both left or right direction.

Proper "h" dimension

Type	h
PC 50	4 mm±1 mm (0.160±0.040 in)
PC 50 HO	4 mm±1 mm (0.160±0.040 in)
PS 50	4 mm±1 mm (0.160±0.040 in)
PS 50 HO	4 mm±1 mm (0.160±0.040 in)

(HO : Indicate Netherlands type)

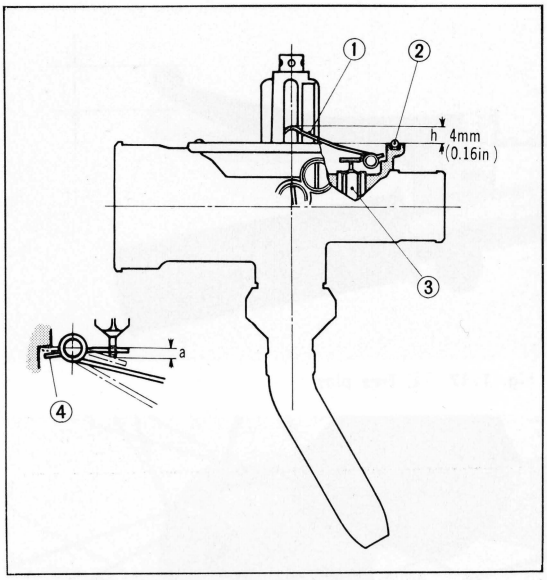


Fig. 1. 16

① Float arm
② O ring
③ Float valve
④ Float arm stopper

(Let stopper so that a 1 mm (0.04 in) minimum when the float valve is fall open)

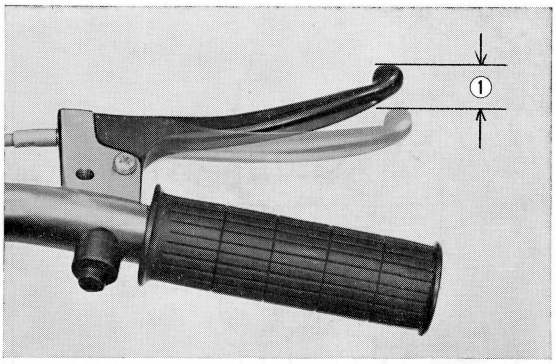


Fig. 1.17 ① Free play

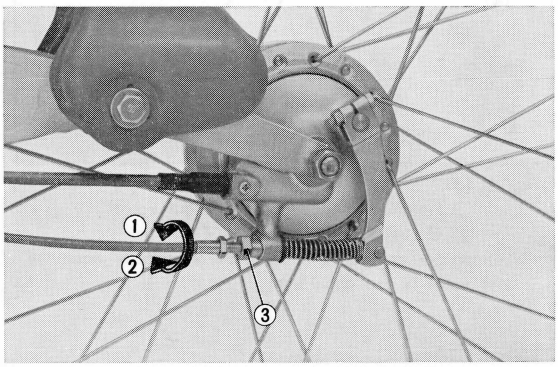


Fig. 1.18 ① To increase ③ Adjusting nut
② To decrease

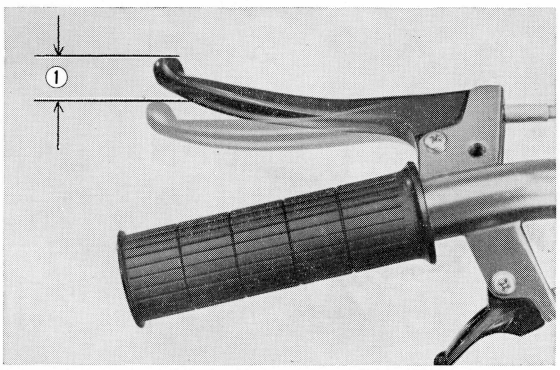


Fig. 1.19 ① Free play

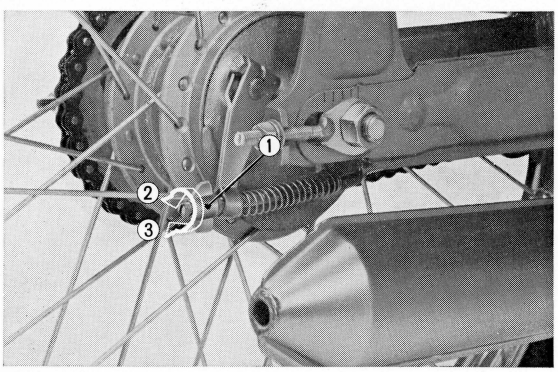


Fig. 1.20 ① Adjusting nut ③ To decrease
② To increase

C. Frame

1. Brake Adjustment

Brakes are the life-line of the rider, therefore, do not neglect to perform the periodic inspection, daily inspection and pre-riding inspection.

Frant Brake Adjustment

The free play of the brake lever, that is, the distance between the normal attitude and the point where the brake starts to take hold should be 10 ~15 mm (0.4~0.6 in.) **(Fig. 1.17)**

Adjustment is made with the adjusting nut. **(Fig. 1.18)**

Rear Brake Adjustment

The free play of the brake lever, that is, the distance between the normal attitude and the point where the brake starts to take hold should be 10 ~15 mm (0.4~0.6 in). **(Fig. 1.19)**

Adjustment is made with the adjusting nut. **(Fig. 1.20)**

2. Security of Component Parts

Bolts, nuts and other threaded fasteners will become loose due to vibration, fatigue of the fastened parts, etc. as a result of long use. To prevent the attaching fasteners from loosening, they should be retightened periodically. **(Fig. 1.21, 22)**

1. Handle set bolts or nuts
2. Front arm pivot bolts
3. Front cushion lower bolts
4. Front wheel axle nut
5. Rear cushion fixing bolt & nut
6. Rear axle nut
7. Steering stem nut
8. Crank arm set pin

When crank arm set pin becomes loose, move both left and right crank arms inward so that no looseness exits in the direction parallel to the shaft. In this condition, install the pin into the arm and tighten with the nut.

9. Front and rear wheel spokes

Riding with loose spokes will place an ununiform loading on the rim as well as on the remaining spokes and will cause the rim to develop runout and the spokes subject to damage. The spokes should be inspected frequently and retorqued when they become loose.

Raise the wheel off the ground and check each spoke for tightness using a spoke wrench. Any spoke which is noticeably loose should be torqued to the same value as the remaining spokes so that the spokes are all of uniform torpue. Use the spoke nipple tool and torque wrench.



Fig. 1.21 (PC 50)

① Handle set bolt
② 8×45 hex bolt
③ Front cushion under bolt
④ Front wheel axle
⑤ Rear cushion setting bolt and nut
⑥ Rear wheel axle
⑦ Steering handle stem nut
⑧ Crank arm set pin
⑨ Front and rear wheel spokes



Fig. 1.22 (PS 50)

① Steering head stem nut
② Steering handle setting nuts
③ Front wheel axle
④ Rear cushion setting bolt and nut
⑤ Rear wheel axle
⑥ Crank arm set pin
⑦ Front and rear wheel spokes

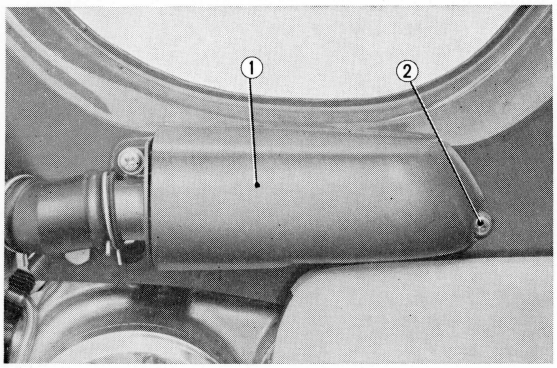


Fig. 1.23 ① Air cleaner case
② 6×20 mm cross screw

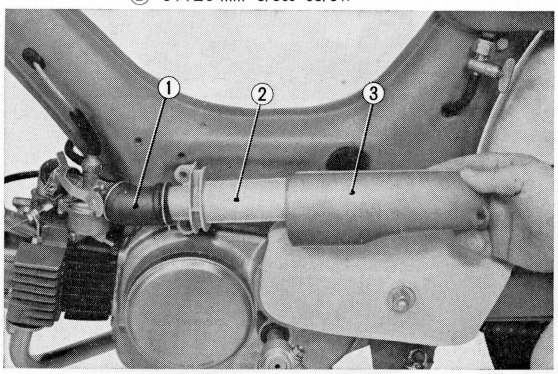


Fig. 1.24 ① Air cleaner connecting tube
② Air cleaner element
③ Air cleaner case

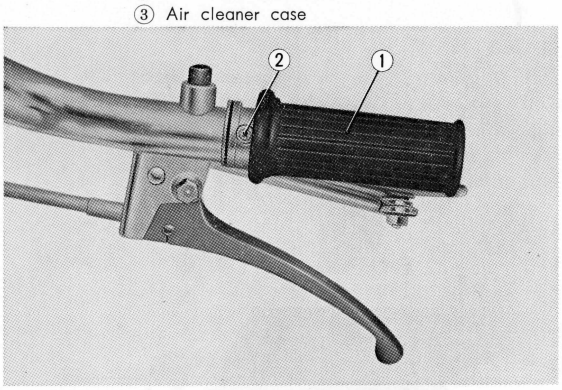


Fig. 1.25 ① Grip rubber ② Screw

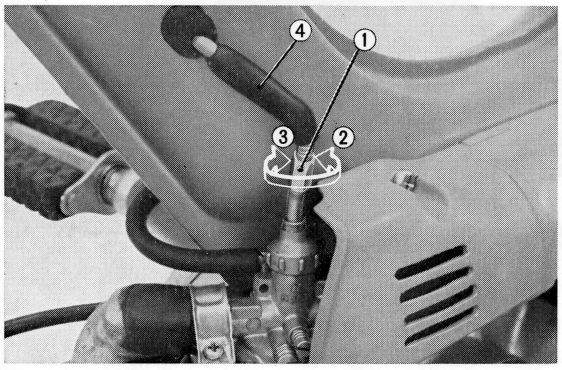


Fig. 1.26 ① Adjusting bolt ③ To increase
② To decrease ④ Cap

3. Air Cleaner Servicing

An air cleaner clogged with dust restricts the free passage of inlet air and results in power loss or drop in acceleration, therefore, periodic servicing of the air cleaner should be performed.

1. Remove the carburetor cover.
2. Remove the 6×20 cross-screw at the air cleaner case.
3. Unclip the air cleaner connecting tube clip and remove the air cleaner element.
4. Tap the air cleaner element lightly to remove the dust or wash in water.

NOTE:

1. Caution not to allow oil to get on the air cleaner element. After washing, reinstall the air cleaner element after it is completely dried.
2. Check to make sure that there is no place for air to leek in.

3. Other Inspections and Adjustments

1. Adjustments of Throttle Grip and Throttle Cable

1. When excessive play exists in the direction parallel to the shaft, turn up the grip rubber and check the screw for looseness. **(Fig. 1.25)**

2. When excessive play exists in the rotating direction, adjust the throttle cable. Make the adjustment with the adjusting bolt. After the adjustment, reinstall the cap securely. **(Fig. 1.26)**

2. Engine Decompression Lever Adjustment

The normal range of movement of the decompression lever is 1.0～1.5 cm (0.4～0.6 in). **(Fig. 1. 27)**

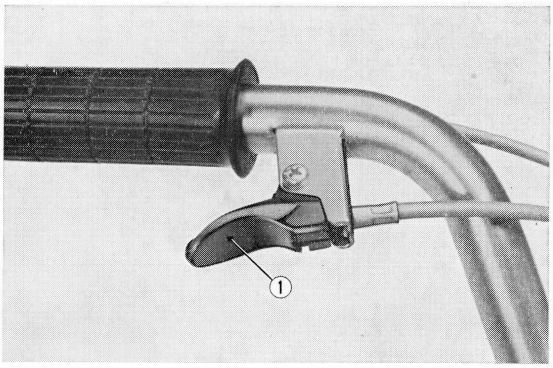


Fig. 1. 27 ① Decompression lever

The adjustment shall be made by loosening the nuts and turning the adjusting bolt. **(Fig. 1. 28)**

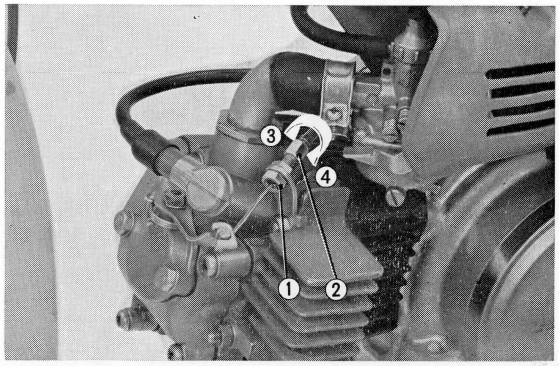


Fig. 1. 28 ① Lock nut ③ To increase
② Adjusting bolt ④ To decrease

3. Handle Height Adjustments

Adjust the handle to the heights most normally used.

Handle Adjustment

1. Loosen the 6×40 mm bolt.
2. Loosen the handle set bolt and tap lightly.
3. Adjust the handle to a suitable height between H and L marked on the stem and fix in place with the handle set bolt and the 6×40 bolt.

H–Upper limit
M–Middle
L–Lower limit **(Fig. 1. 29)**

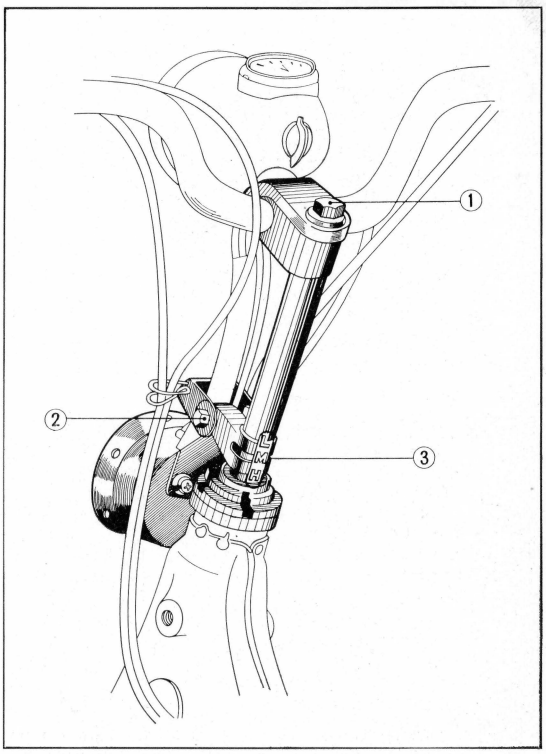


Fig. 1. 29 Adjustment point
① Handle setting bolt ③ Adjusting position
② 6×40 mm hex bolt

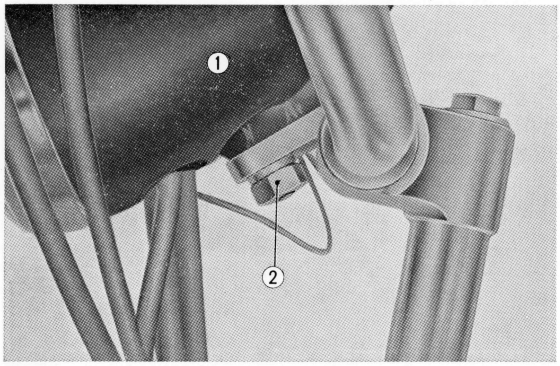


Fig. 1.30
① Headlight case ② Nut

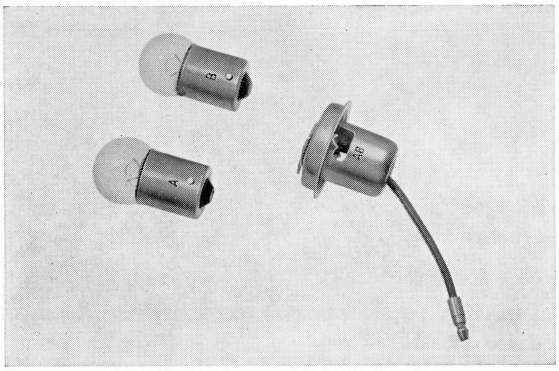


Fig. 1.31 Headlight bulbs

4. Head Light Adjustment

Beam Adjustment

The head light case mount is of ball and socket type. With the nut loosened it can be adjustable in any directions. **(Fig. 1.30)**

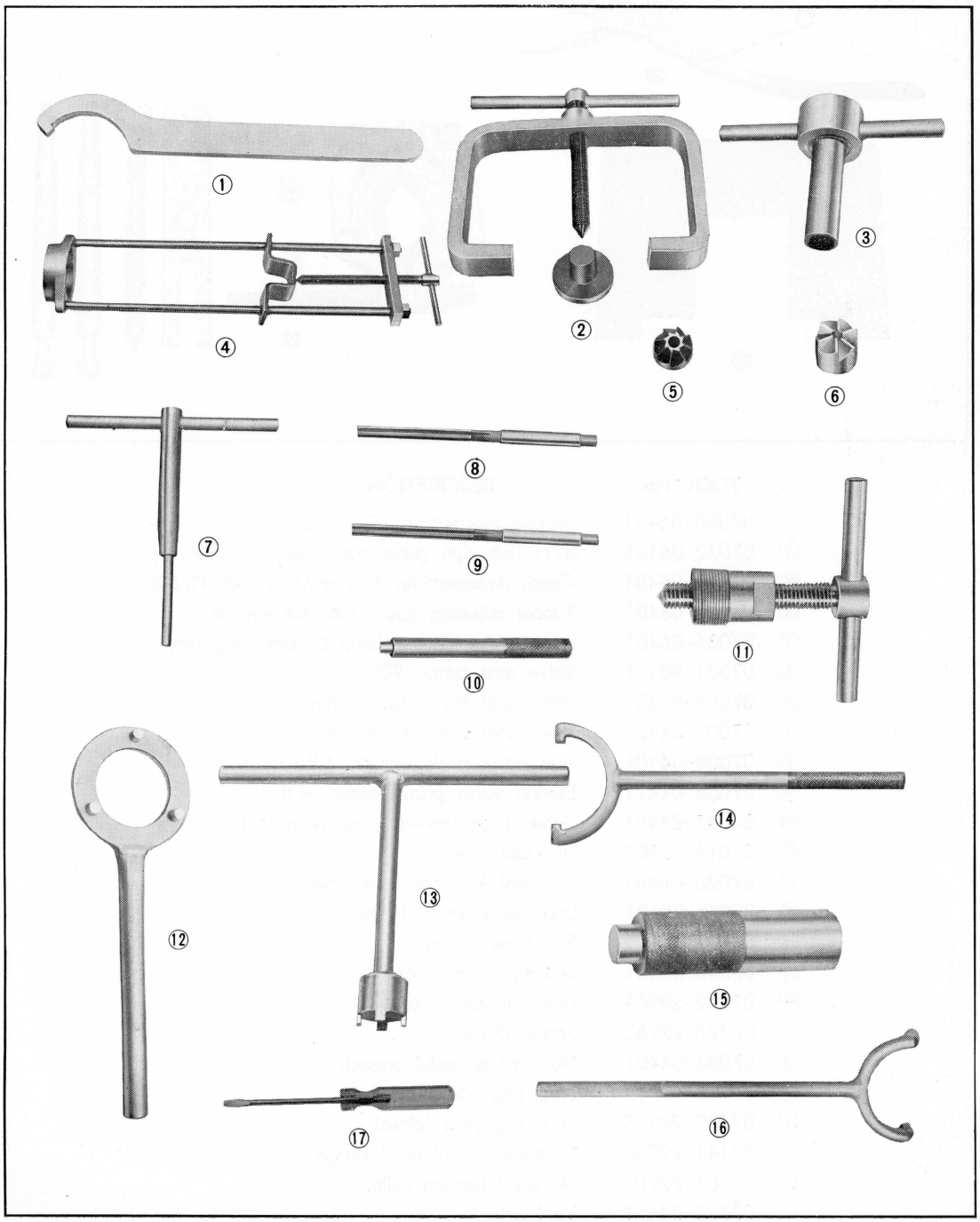
Focus Adjustment

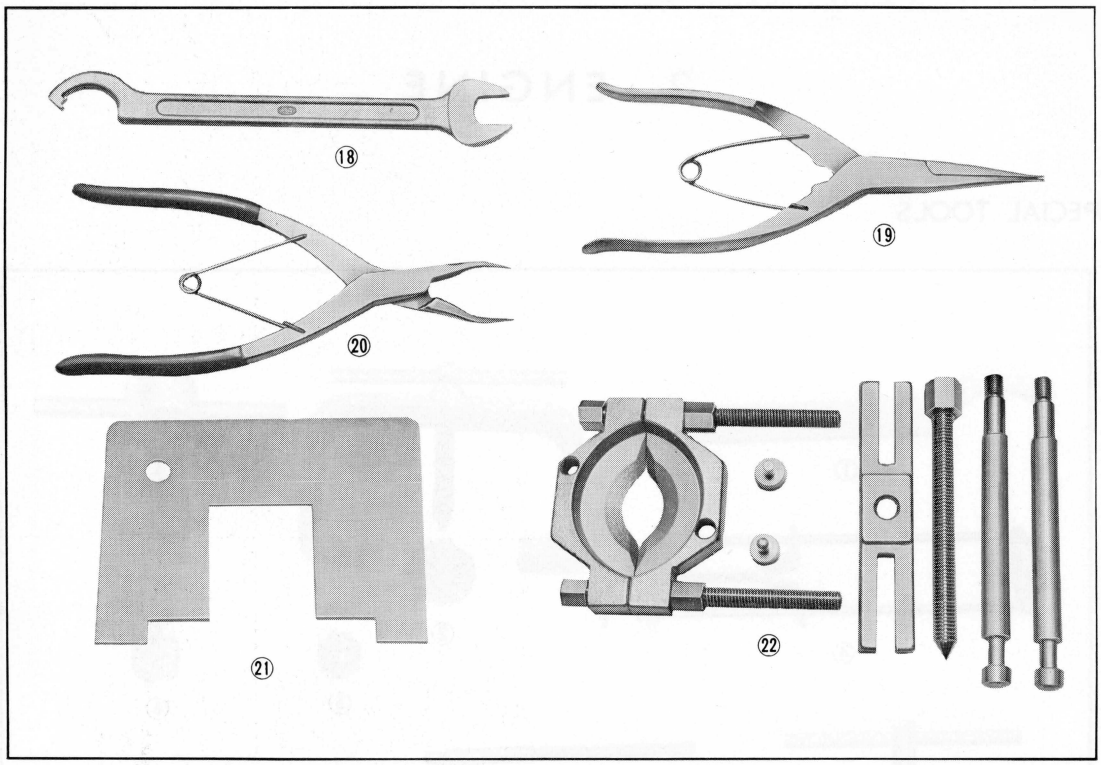
There are two types of bulb.

Type A bulb shall be installed by fitting to the groove A in the socket and type B bulb to the groove B. **(Fig. 1.31)**

2. ENGINE

SPECIAL TOOLS





	TOOL No.	DESCRIPTION
	07000-06401	Special tool set for PC/PS 50
①	07072-06401	Front fork pipe guide cap wrench (PS 50)
②	07038-06401	Clutch disassembling & assembling tool (PS 50)
③	07087-06401	Tappet adjusting screw lock nut wrench
④	07035-06401	Rear cushion disassembling & assembling tool
⑤	07001-80101	Valve seat cutter, 90°
⑥	07003-80101	Valve seat flat surface cutter
⑦	07007-04401	Valve seat cutter holder, 4.8 mm
⑧	07008-04401	Inlet valve guide reamer, 4.8 mm
⑨	07008-04411	Exhaust valve guide reamer, 4.8 mm
⑩	07047-04401	Valve guide driving & removing tool
⑪	07016-02301	Flywheel puller
⑫	07025-04401	Flywheel & clutch outer holder
⑬	07086-00101	Lock nut wrench, 14 mm
⑭	07072-04401	Top cone spanner
⑮	07048-04401	Bearing driving tool
⑯	07022-20001	Drive sprocket holder
⑰	07776-99982	Screw driver
⑱	07083-04401	Stem nut & pedal wrench
⑲	07782-99919	Snap ring plier (open)
⑳	07782-99925	Snap ring plier (close)
㉑	07144-99922	Carburetor float level gauge
㉒	07784-99908	Universal bearing puller
	07790-04401	Tool box

2.1 Engine Removal and Installation

A. Engine Removal

(PC 50)

1. Remove the carburetor cover.
2. Remove the high tension terminal.
3. Disconnect the decompression cable at the engine. **(Fig. 2. 1)**

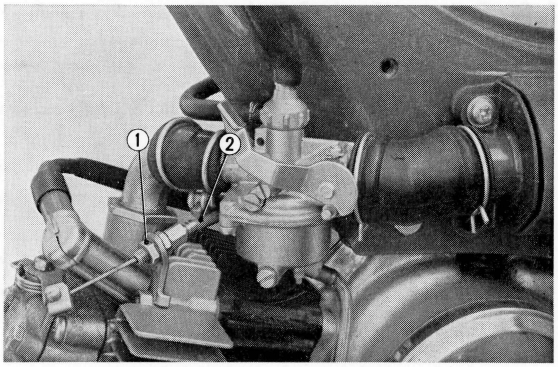


Fig. 2. 1 (PC 50)
① Lock nut ② Decompression cable

4. Loosen the inlet pipe rubber clamp and then remove the carburetor.
5. Separate the muffler.
6. Remove the chain case.
7. Disconnect the drive chain.
8. Remove the crank arm.
9. Remove the two 8 mm hex nuts and pull out the engine hanger bolts from left side.
10. Disconnect the engine electrical leads.

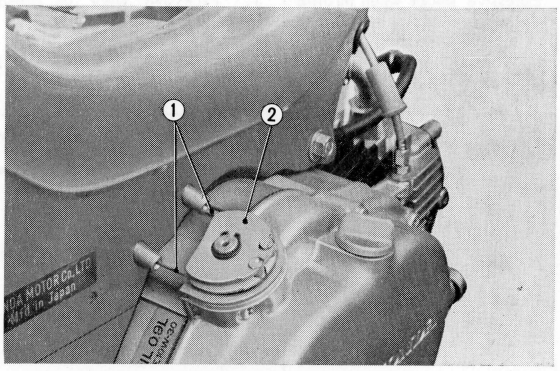


Fig. 2. 2 (PS 50)
① Gear change cable ② Gear shift wheel

(PS 50)

1. Remove the carburetor cover.
2. Remove the high tension terminal.
3. Loosen the inlet pipe rubber clip and remove the carburetor.
4. Remove the muffler.
5. Disconnect two gear change cables from the gear shift wheel. **(Fig. 2. 2)**
6. Disconnect the clutch cable from the clutch lever. **(Fig. 2. 3)**
7. Disconnect the rear brake cable from the brake lever.
8. Remove the drive chain cover, and disconnect the drive chain.
9. Remove the crank arm from both side.
10. Remove the two 8 mm engine hanger bolts and the engine can be separated from the frame.

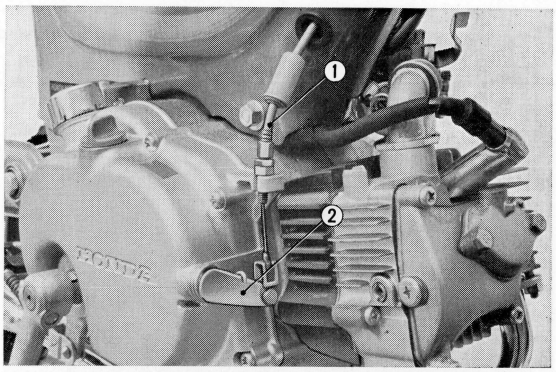


Fig. 2. 3 (PS 50)
① Clutch cable ② Clutch lever

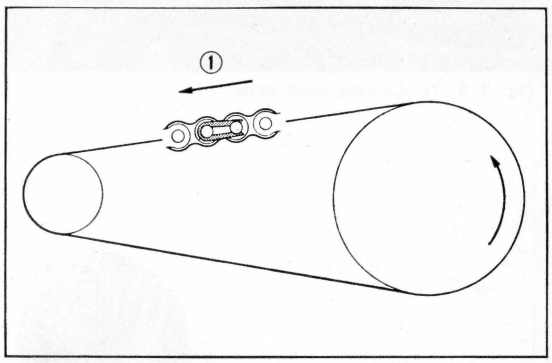


Fig. 2. 4 ① Normal direction of chain

2. 2 Cylinder Head, Cylinder, Piston, Piston Ring (PC/PS 50)

Trouble	Probable cause	Corrective action
Low compression pressure or no pressure	1. No slack in the decompression lever cable (PC 50)	1. Provide 10~15 mm (0.4~0.6 in) play at the end of the lever
	2. Insufficient tappet clearance	2. Adjust to 0.05 mm (0.002 in)
	3. Gas leak from the cylinder head gasket	3. Torque all cylinder head bolts to the proper value, refer to torque table
	4. Excessive piston or ring wear	4. Replace
	5. Valve not properly seating or carbon particle caught between valve and seat	5. Lap valve seat and remove carbon
	6. Valve timing off	6. Retime
	7. Burnt valve or seizure	7. Replace
Excessive smoke when throttle opened	1. Excessive wear or damage to piston, cylinder, piston ring	Replace
	2. Excessive wear to valve guide	
	3. Loose valve guide	
Engine overheat	1. Low engine oil level, poor quality oil	1. Add oil to the proper level marked on gauge (0.8 lit) (1.5 US pt./1.3 Imp. pt) [PS 50 : 0.9 lit (1.7 US pt., 1.4 Imp pt.)]
	2. Damaged spark plug, wrong heat range plug	2. Clean or replace
	3. Point gap requires adjustment, cleaning	3. Adjust
	4. Ignition timing retarded	4. Adjust
	5. Dragging brakes	5. Adjust to 1.5~2.0 cm (0.6~0.8 in)
	6. Lean air-fuel mixture	6. Adjust carburetor
	7. Carbon deposit in combustion chamber	7. Remove carbon
	8. Worn piston and ring	8. Replace
Decompression lever inoperative (PC 50)	1. Excessive slack in lever cable	1. Adjust or replace

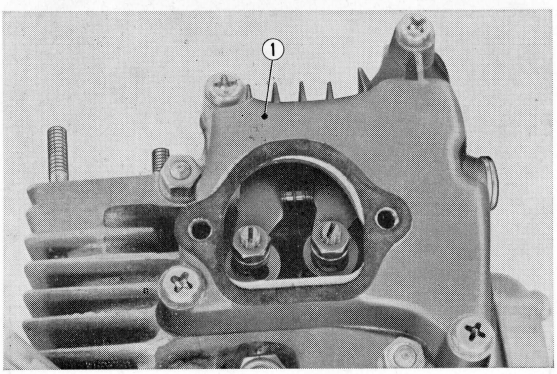


Fig. 2. 5 ① Cylinder head cover

A. Removal of Cylinder head, Camshaft, Valve.

1. Remove cylinder head cover. **(Fig. 2-5)**

2. Extract the rocker arm shaft and remove the rocker arms. **(Fig. 2. 6)**

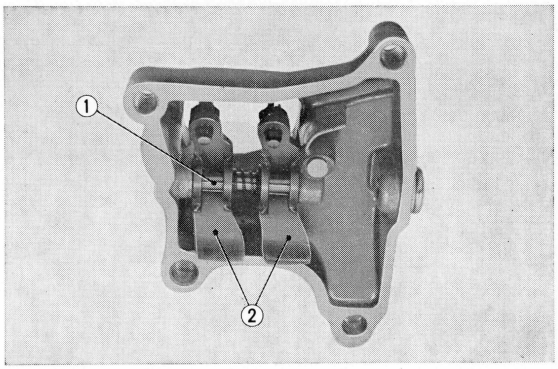


Fig. 2. 6 ① Valve rocker arm shaft
② Valve rocker arm

3. Extract the 3 × 12 camshaft locking dowel pin and then pull out the camshaft center pin.

NOTE :

Camshaft center pin can be easily removed by screwing in a bolt. **(Fig. 2. 7)**

4. Disengage the camshaft from the cam chain.

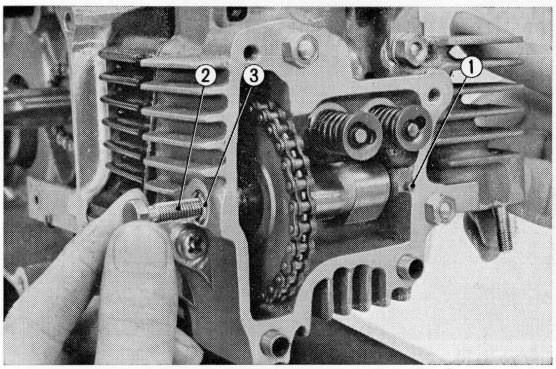


Fig. 2. 7 ① 3 × 12 dowel pin ③ Cameshaft center pin
② Bolt

5. Unscrew four 6 mm nut, a 6 mm screw and then separate the cylinder head from the cylinder. **(Fig. 2. 8)**

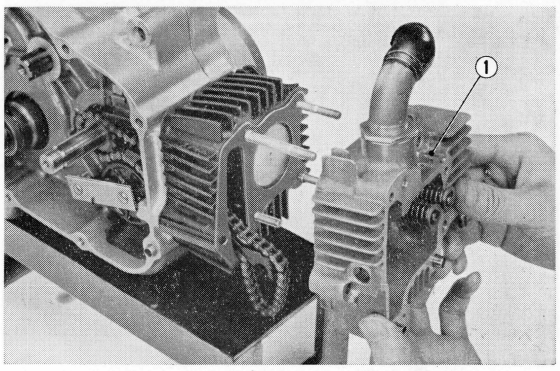


Fig. 2. 8 ① Cylinder head

B. Disassembly of the valve

1. The valve can be removed by pressing down on the valve retainer and matching the recess in the retainer to the end of the valve. **(Fig. 2. 9)**

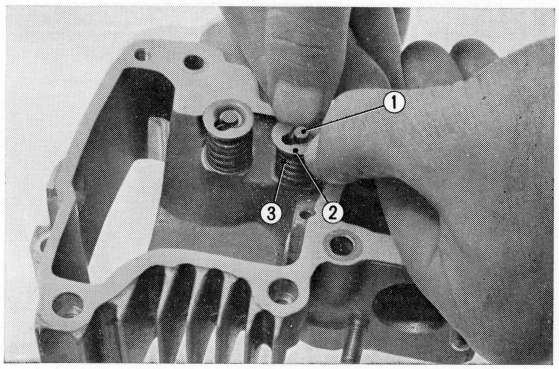


Fig. 2. 9 ① Valve ③ Valve spring
② Valve spring retainer

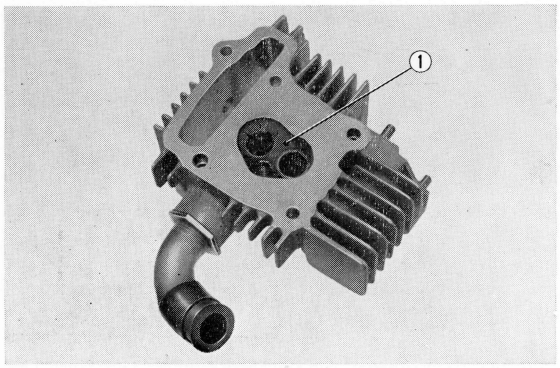


Fig. 2.10 Cylinder head

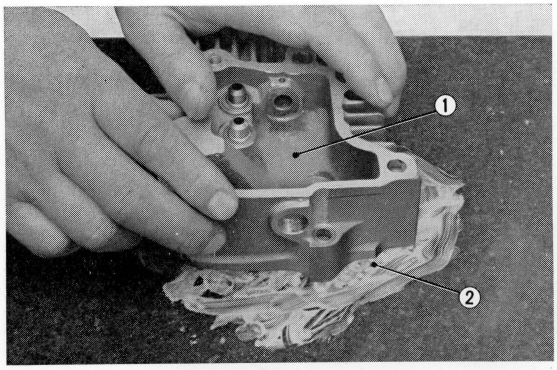


Fig. 2.11 ① Cylinder head
② Red lead or bluing

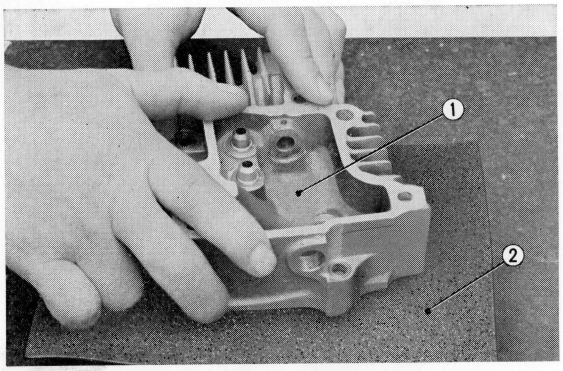


Fig. 2.12 ① Cylinder head
② # 400 emery paper

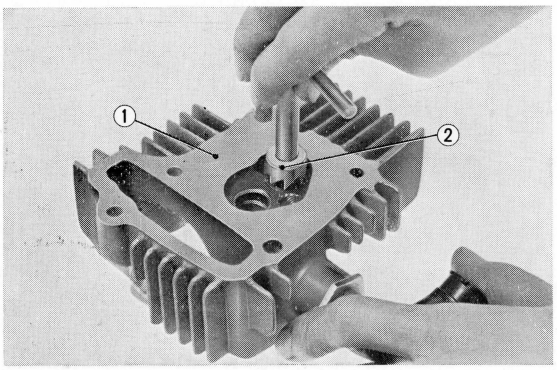


Fig. 2.13 ① Cylinder head
② Valve seat cutter

C. Inspection and Repair

1. If the cylinder head is not properly torqued, the head will warp or distort due to the high temperature and pressure to which it is exposed. This will result in improper sealing of the cylinder head and cause troubles due to gas leak, air suction and low compression. **(Fig. 2. 10)**

2. The warping of the cylinder head does not develop suddenly and, therefore, it is very difficult to detect. Since the head warpage is chiefly due to improper head torquing, adequate attention should be given. To check for cylinder head warpage, apply a thin coating of red lead or bluing on a surface plate and then work the head mating surface on the coated surface plate. The red lead or bluing will be transferred to the head surface indicating high and low spots. **(Fig. 2. 11)**

Warped cylinder head may be repaired by sanding the cylinder head on the surface plate using a # 200 grade emery paper and then finishing with a # 400 grade emery paper followed by checking as stated above. **(Fig. 2. 12)**

Combustion Chamber

Item	Standard value
Height	5. 5 mm (0.22 in)
Volume	5 cc

Use a carbon scraper or brush to remove the carbon from the head and exercise care not to damage.

3. Inspect the valve seat by assemblying the valves and pour oil into the combustion chamber to cover the valves. Apply a blast of compressed air into each ports ; if bubbles are produced, it is an indication that the valves are not properly sealing and repair is necessary.

Check the seating width of the valve by applying a thin even coat of red lead or bluing on the valve face and rotating the valve slowly in the seat while applying slight pressure. The valve contact width will be indicated by the transfer of the red lead or bluing.

Standard Value : 0.7～1mm (0.028～0.039 in)

The recutting of the valve seat are performed by the two different types cutters included in the special tool kit. They are the valve seat repair cutter which is performed by the 90° cutter and the flat cutter. The 90° cutter is used to cut the valve seat and the flat surface cutter is used to repair the width of the valve contact surface.

4. Inlet valve

unit : mm

Item	Standard value	Serviceable limit
Diameter	4.780～4.790 (0.188～0.189 in)	4.74 (0.187 in) min
Overall length	49.05 (1.928 in)	48.1 (1.895 in) min
Head thickness	0.4～0.6 (0.016～0.024 in)	0.2 (0.008 in) min

Exhaust valve

Diameter	4.770～4.780 (0.187～0.188 in)	4.73 (0.186 in) min
Overall length	49.05 (1.928 in)	48.1 (1.895 in) min
Head thickness	0.4～0.6 (0.016～0.024 in)	0.2 (0.008 in) min

NOTE :

Valve marked "IN" must be used inlet valve, however, valve without any marking may be used for either inlet or exhaust.

The diameters of the valve guides are different for the inlet and exhaust valves, therefore, when reaming the guides, use particular caution to ream the guides to their respective diameters by the use of the proper reamers. **(Fig. 2. 15)**

Inlet valve guide reamer ; tool No. 07008-04401

Exhaust valve guide reamer : tool No. 07008-04411

5. Valve spring **(Fig. 2. 16)**

Item	Standard value	Serviceable limit
Free length	22.92 (0.902 in)	21 (0.827 in) min.
Tension	4.25～4.75 kg/12.45 mm 9.35～10.45 lb/0.490 in)	———
Trueness	1°30′	2° max.

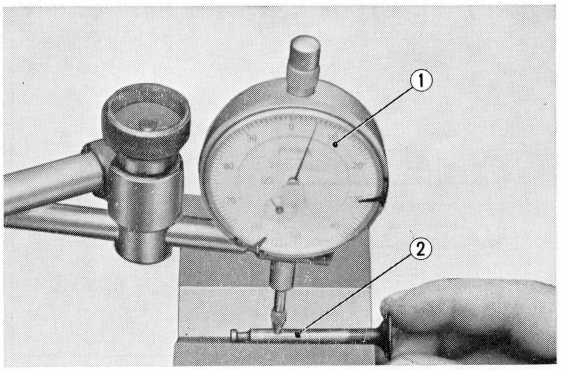


Fig. 2. 14 ① Dial gauge ② Valve

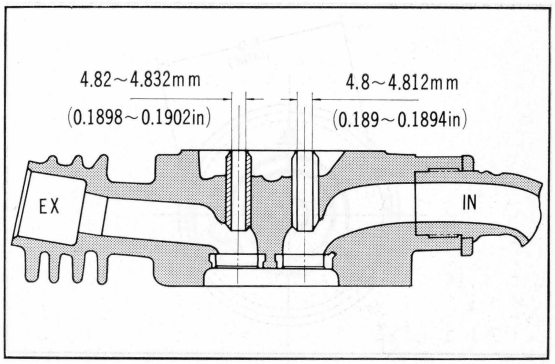


Fig. 2. 15 Valve guide dimensions

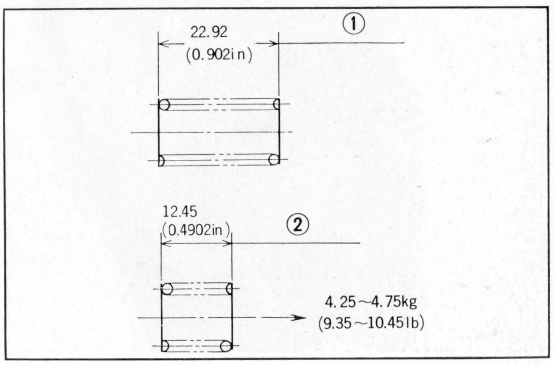


Fig. 2. 16 ① Free length
② Installed length

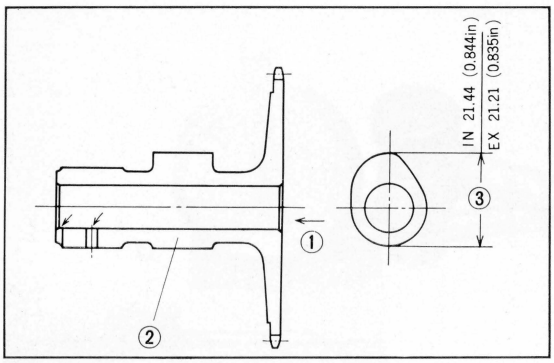


Fig. 2.17 ① Oil ② Camshaft ③ Cam total height

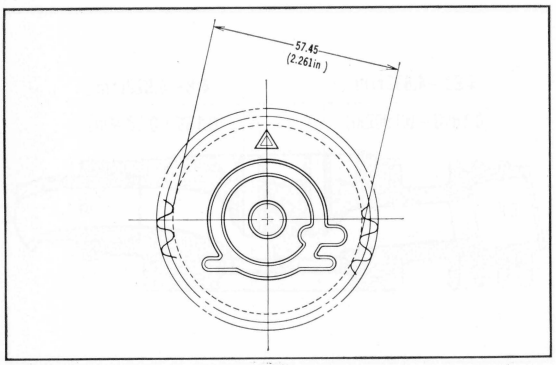


Fig. 2.18 Cam sprocket

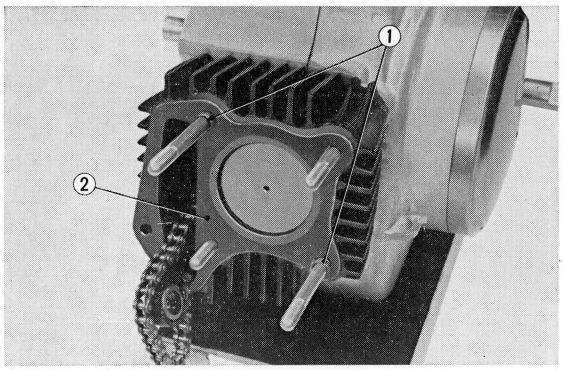


Fig. 2.19 ① Hollow dowel pin ② Cylinder head gasket

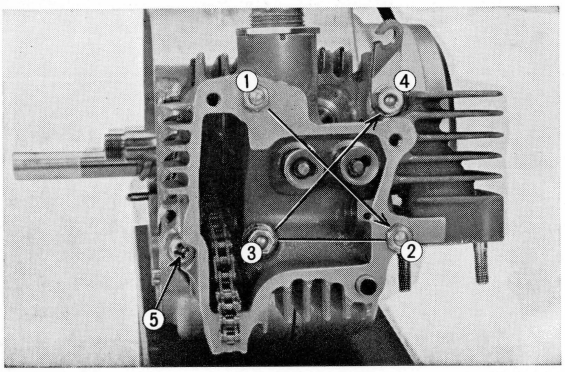


Fig. 2.20 Torquing sequence of cylinder head

6. Camshaft **(Fig. 2.17)**

Item	Standard value	Serviceable limit
Cam height	IN 21.44 (0.844 in)	17.8 (0.701 in) min. at base circle.
Cam height	EX 21.21 (0.835 in)	

7. Replace cam sprocket if gear teeth are damaged or excessively worn.

8. Cam sprocket root diameter. **(Fig. 2.18)**
Standard value : 57.45 (2.261 in)

D. Reassembly

1. Reassemble the valve assembly.
2. Assemble the cylinder head, exercise care not to damage the cam chain and oil guide.

NOTE :

When installing the head, do not forget the head gasket and the two hollow dowel pins. **(Fig. 2.19)**

3. Install the four 6 mm nuts and a 6 mm screw. Torque the cylinder head nuts to **90～120 km·cm (6.5～8.7 ft·lb)**

NOTE :

Torque the nuts diagonally and with a uniform force. **(Fig. 2.20)**

4. Align the black mark on the timing sprocket and the arrow mark on the cam sprocket along straight line and then assemble the cam chain.

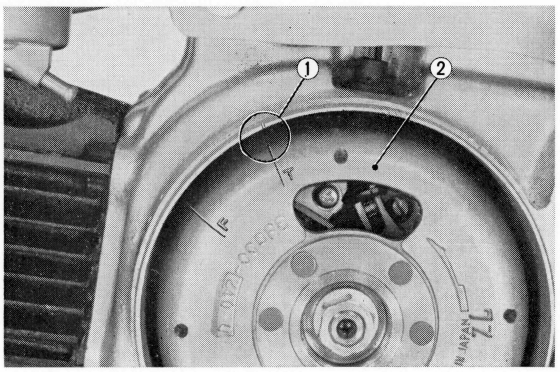


Fig. 2. 21 ① Left crankcase index mark
② Flywheel

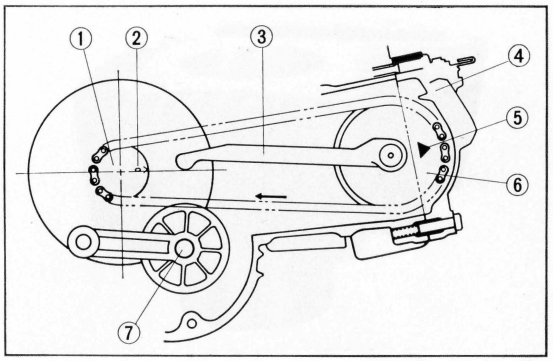


Fig. 2. 22 Installing the cam chain
① Timing sprocket
② Punch mark
③ Oil guide
④ Cylinder head
⑤ Arrow mark
⑥ Cam sprocket
⑦ Cam chain guide roller

5. Align the holes in the oil guide and center pin and tap the center pin in with light stroke. **(Fig. 2. 23)**

NOTE :

a. Insert the center pin so that the O ring on the center pin is below the cylinder head center pin hole. While installing, the exercise care not to damage the O ring.

b. Check to make sure that the 10 mm washer is not missing.

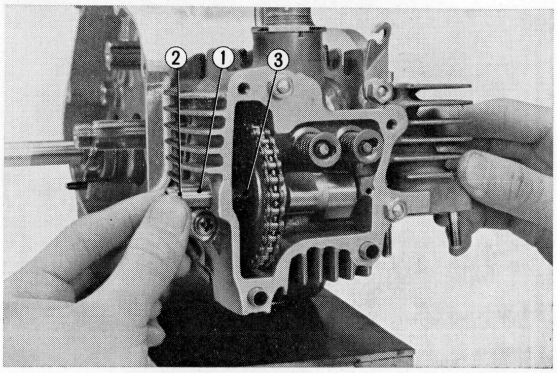


Fig. 2. 23 ① Center pin
② 8.1 × 1.0 O ring
③ Oil guide

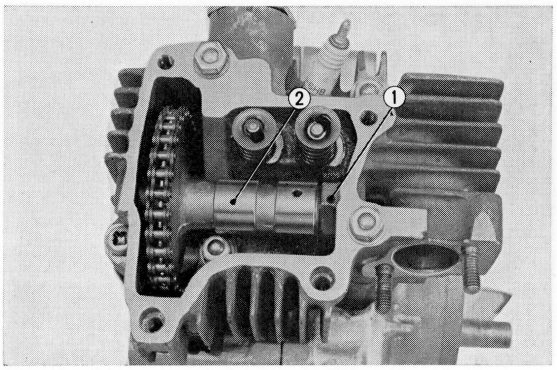


Fig. 2. 24 ① 3×12 mm dowel pin
② Cam shaft

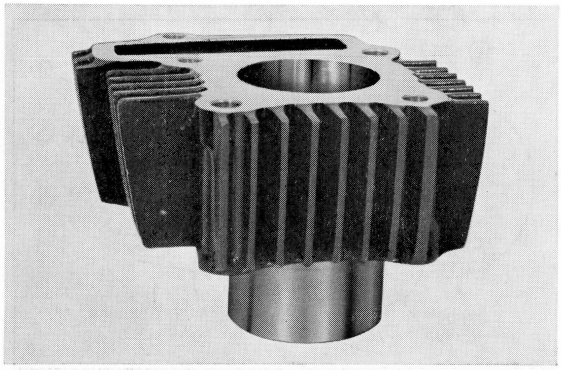


Fig. 2. 25 Cylinder

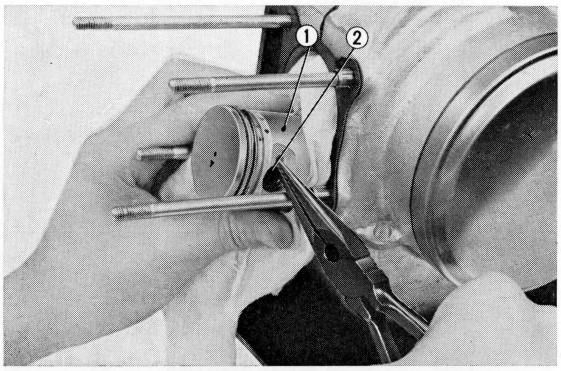


Fig. 2. 26 ① Piston ② Clip

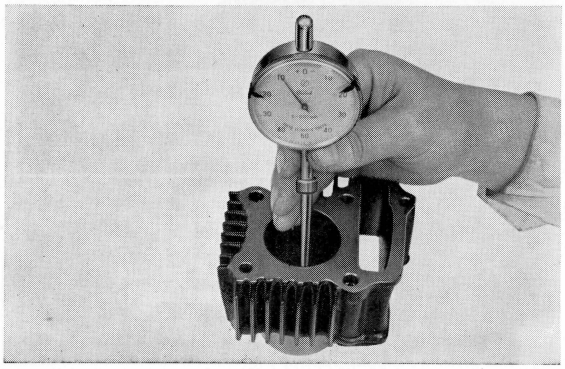


Fig. 2. 27 Measuring inner diameter

6. Align the camshaft lock pin hole with the pin hole in the cylinder head by using a screwdriver for turning and then drive in the 3×12 dowel pin. **(Fig. 2. 24)**

NOTE :

a. After assembly, rotate the flywheel several times to check for smooth operation and also check the valve timing.

b. During the dowel pin installation, exercise care not to damage the gasket.

7. Assemble the cylinder head cover.

E. Disassembly of Cylinder, Piston, Piston ring

1. Remove cylinder head, refer to section 2. 2 A.
2. Remove cylinder **(Fig. 2. 25)**
3. Extract piston pin clip and remove piston pin. **(Fig. 2. 25)**

NOTE :

Caution not to drop clip into the case.

4. Remove piston ring.

F. Inspection, Repair

1. Check cylinder diameter

Item	Standard value	Serviceable limit
Diameter	42.0～42.01 (1.654～1.655 in)	42.1 (1.658 in) max.

2. Remove carbon deposit from piston head and ring groove, exercising care not to damage the piston.

NOTE :

Do not use emery paper.

3. Check piston diameter **(Fig. 2. 28)**

Item	Standard value	Serviceable value
Diameter	41.98～42.0 (1.653～1.654 in)	41.9 (1.650 in) min.

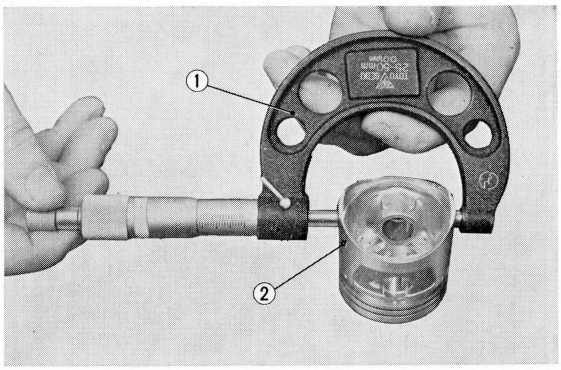


Fig. 2. 28 ① Micrometer ② Piston

4. Piston ring side clearance

Check the clearance witn a new ring. **(Fig. 2. 29)**

5. Piston pin bore

Item	Standard value	Serviceable limit
Diameter	13.002～13.008 (0.5119～0.5121 in)	13.05 (0.514 in) max.

6. Piston pin diameter

Item	Standard value	Serviceable limit
Diameter	12.994～13.000 (0.5116～0.5118 in)	12.98 (0.510 in) min

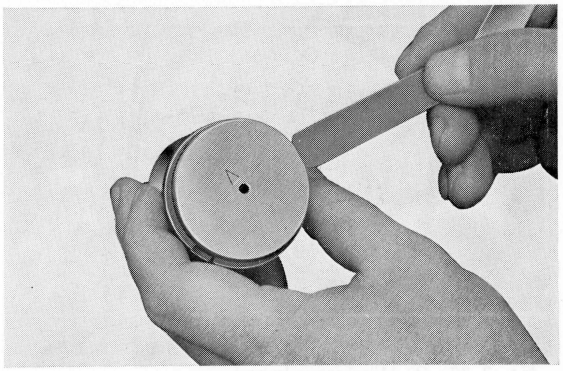


Fig. 2. 29 Checking the clearance

7. Piston ring end gap

Fit the ring into the cylinder squarely and measure the end gap with a thickness gauge. **(Fig. 2. 30)**

Item	Standard value	Serviceable limit
End gap	0.1～0.3 (0.004～0.012 in)	0.6 (0.024 in) max.

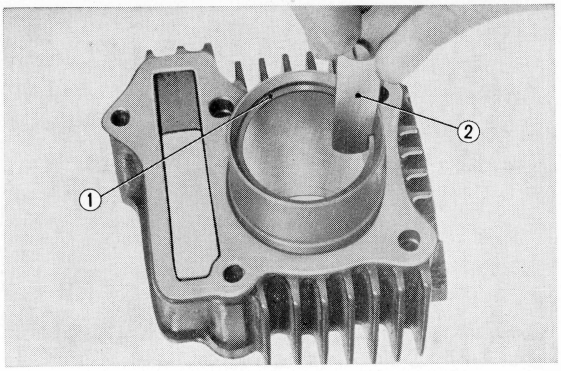


Fig. 2. 30 ① Piston ring ② Thickness gauge

8. Ring tension

Item	Standard value	Serviceable limit
Top ring	0.35～0.65 kg (0.77～1.43 lbs)	0.2 kg (0.44 lbs) min.
2nd ring	0.35～0.65 kg (0.77～1.43 lbs)	0.2 kg (0.44 lbs) min.
Oil ring	0.58～0.93 kg (1.28～2.05 lbs)	0.45 kg (0.99 lbs) min.

9. Ring width and thickness

Item		Standard value	Serviceable limit
Width	All rings	1.90～2.10 (0.0748～0.0827 in)	——
Thickness	Top ring	1.180～1.195 (0.0465～0.0470 in)	1.14 mm min. (0.0449 in)
	2nd ring	1.180～1.195 (0.0465～0.0470 in)	1.14 mm min. (0.0449 in)
	Oil ring	2.480～2.495 (0.0976～0.0982 in)	2.44 mm min. (0.0960 in)

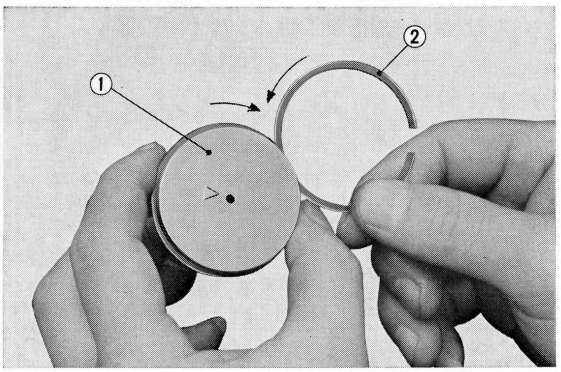


Fig. 2. 31 ① Piston ② Piston ring

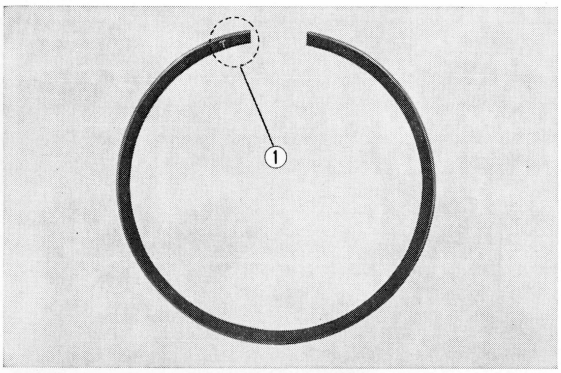


Fig. 2. 32 ① Manufacturer's mark

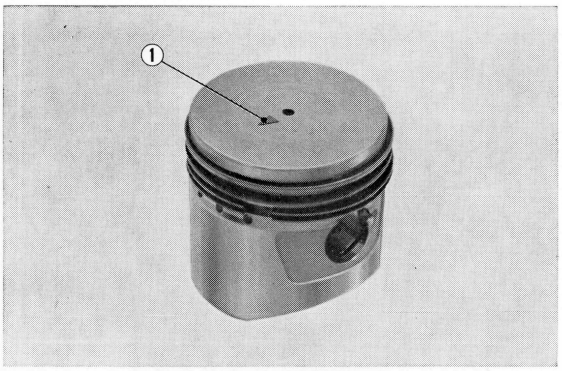


Fig. 2. 33 ① Arrow marking

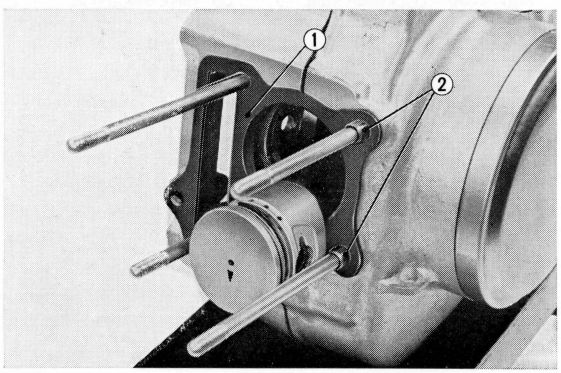


Fig. 2. 34 ① Cylinder gasket
② Hollow dowel pin

G. Reassembly

1. Assemble the piston ring to the piston

NOTE :

a. When assemblying new rings, roll the rings in their respective piston grooves to check the fit. **(Fig. 2. 31)**

b. The ring must have the maker's mark on the ring toward the top. **(Fig. 2. 32)**

2. Install the piston

NOTE :

Make sure that the arrow on the piston head in pointing downward.

3. Install the pin clips at both ends of the piston pin.

NOTE :

a. The clip opening should not be aligned to the cut out.

b. Distorted or clips which have lost its tension should be replaced with a new part.

4. Before installing the cylinder, make sure that the cylinder gasket and the two hollow dowel pins are in place. **(Fig. 2. 34)**
5. Space the ring gaps evenly apart for all rings.
6. Trim the crankcase gasket with a sharp knife if it extends above the cylinder mating surface.

2. 3 Reduction, Cam Chain Tensioner, Oil Guide, Crankshaft

Trouble	Probable cause	Corrective action
Engine will not start (PC 50)	1. Drive plates and friction plates are not making uniform contact 2. Excessively worn friction plate disc 3. Excessively worn ball rolling surface 4. Weak clutch spring 5. The clutch weight is not pressing against the friction plate due to excessive wear of the clutch weight spring hook	1. Replace or repair, refer to section 3. A 2. Replace friction plate 3. Replace clutch outer, friction plate or ball retainer 4. Replace clutch spring 5. Replace clutch weight
Engine speed with clutch disengaged is too fast or slow	1. Loss of clutch spring tension 2. Excessively worn or burnt clutch weight shoe 3. Excessively worn clutch outer friction surface 4. Excessively worn clutch weight hook 5. Excessively worn clutch friction disc (PS 50)	1. Replace, refer to section 2. 3 A 2. Replace 3. Replace 4. Replace, refer to section 2. 3 A 5. Replace
Clutch suddenly engages during idling and cause engine to stop	1. Too high an idling speed 2. Weak clutch spring 3. Clutch defective or out of adjustment	1. Adjust to 1500 rpm 2. Replace 3. Replace or adjust
Disengaging lever in operative will not engage with engine in ON position (PC 50)	1. Defective free pawl 2. Worn groove in countershaft gear 3. Free pawl guide disengaged from free pawl	1. Replace 2. Replace countershaft gear 3. Repair
Cycling lever inoperative, will not disengage from engine in OFF position (PC 50)	1. Excessively worn or defective cycling lever 2. Free pawl spring bent over	1. Replace 2. Replace
Engine oil changes to emulsion	1. Water mixed in oil 2. Clogged breather pipe	Oil even though clean in appearance may be decomposed when used for a long period, thins out and looses lubricating quality

A. Disassembly of Reduction Gear (PC 50)

1. Remove the engine in accordance with section 2.1 A.
2. Remove the cylinder head and cylinder in accordance with section 2. 2.
3. Remove the right crankcase cover.
4. Unscrew the 14 mm lock nut with the special tool (Tool No. 07086-00101) and remove the clutch assembly.
5. Remove the 17 mm circlip and then disassemble the primary driven gear. **(Fig. 2. 35)**
6. Remove cam chain tensioner arm by either filing or chiseling the cam chain tensioner arm mounting rivet.

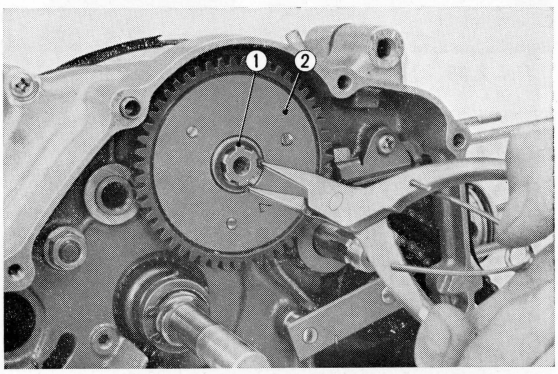


Fig. 2. 35 ① 17 mm circlip ② Primary driven gear

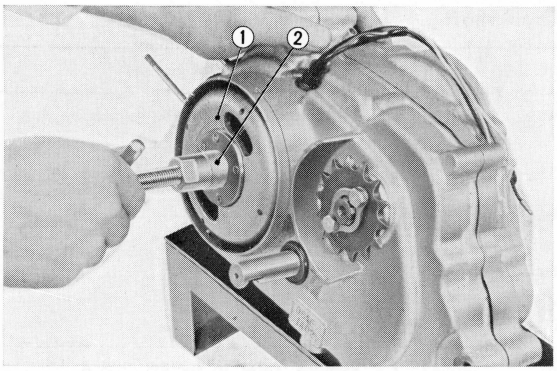


Fig. 2.36 ① Flywheel ② Flywheel puller

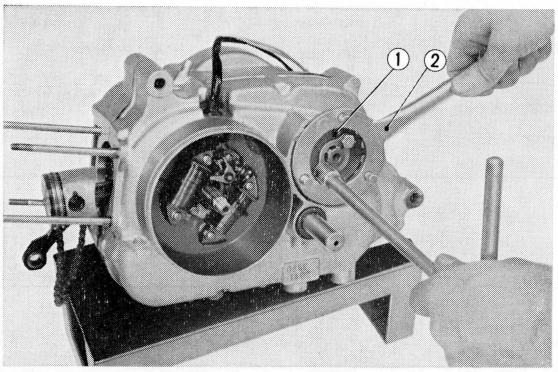


Fig. 2.37 ① Drive sprocket ② Drive sprocket holder

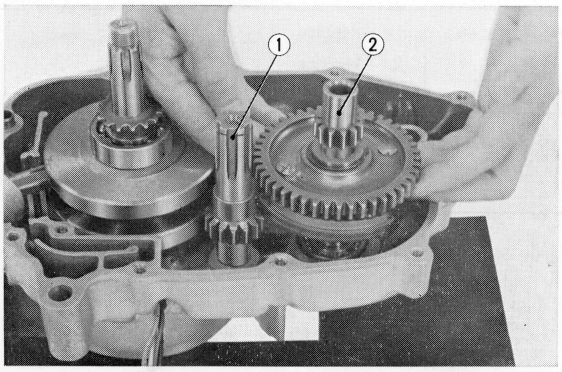


Fig. 2.38 ① Mainshaft ② Countershaft

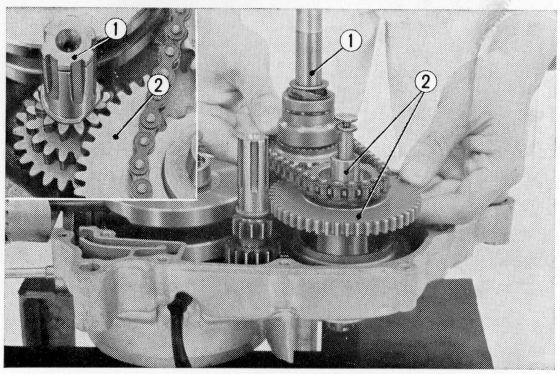


Fig. 2.39 ① Pedal shaft assembly
② Transmission countershaft and gear

NOTE :

It is only necessary to remove the cam chain tensioner rivet when the cam chain tensioner is to be replaced. Removal of the rivet is not required for disassembly of the transmission.

7. Remove the oil guide.
8. Remove the dynamo cover and remove the flywheel. **(Fig. 2. 36)**
9. Remove the drive sprocket. **(Fig. 2. 37)**
10. Remove the friction spring incorporated on the kick starter ratchet.
11. Unscrew the seven 6 mm crankcase screws and remove the right crankcase.
12. Remove the pedal shaft assembly.
13. Remove the counter shaft assembly and the main shaft assembly. **(Fig. 2. 38)**
14. Loosen the 10 mm hex. nut and remove the starter idle gear shaft.

(PS 50)

1. Disassembly procedure for the PS 50 it is identical to the PC 50 from steps 1-11.
2. Disassemble the pedal shaft assembly and counter shaft low gear. **(Fig. 2. 39)**
3. Remove the counter shaft second and top gear.
4. Remove the crankshaft.
5. Remove the main shaft.

B. Inspection and Repair

1. Check clutch spring tension.
2. Inspect for damage and wear of the #10 steel ball. **(Fig. 2. 40)**
3. Inspect drive plate friction surface for wear.
4. Inspect gear teeth for wear and damage.

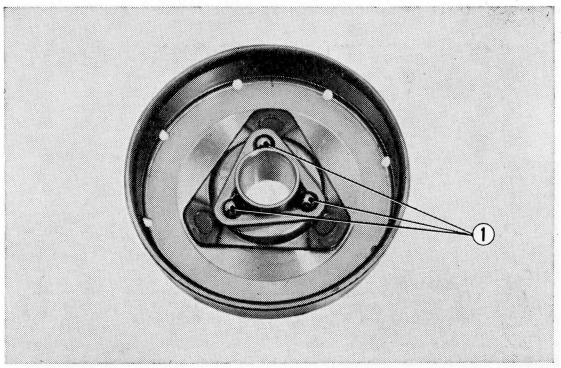


Fig. 2. 40 ① # 10 steel balls

(PS 50 Clutch Adjustment)

Whenever the clutch disengagement is poor or if the height "h" between the cover flange of the right crankcase ① and the end of the clutch outer cover pin ③ is less than **44.2** mm **(1.74 in)**, install a 10 mm washer ② (Part No. 90466-064-000) between the bearing and the clutch outer cover pin as shown in **Fig. 2. 41.**

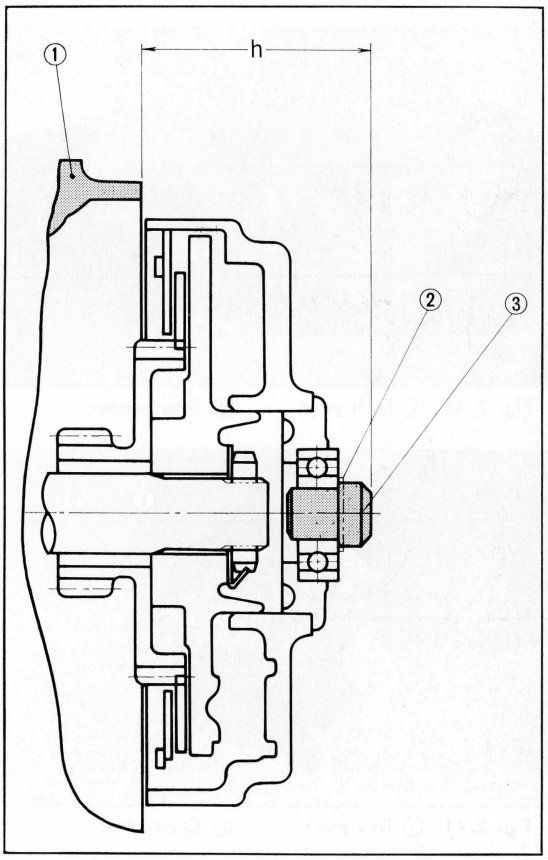


Fig. 2. 41 ① R. crank case ③ Clutch outer cover pin
② 10 mm washer

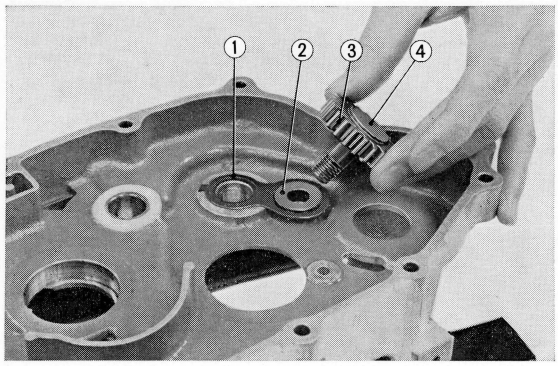


Fig. 2.42 ① Counter washer ③ Starter idle gear
② Idle gear collar ④ Idle gear shaft

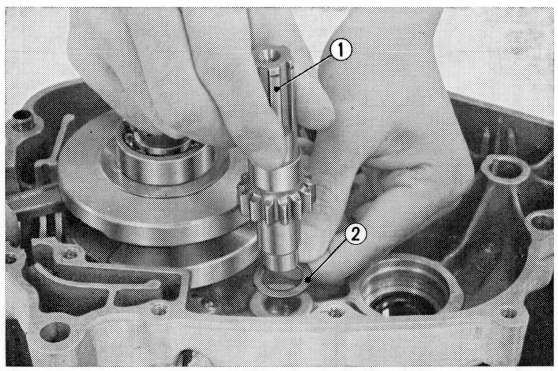


Fig. 2.43 ① Main shaft ② Thrust washer

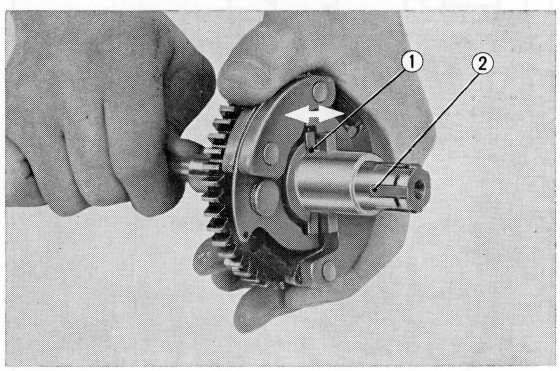


Fig. 2.44 ① Free pawl ② Countershaft

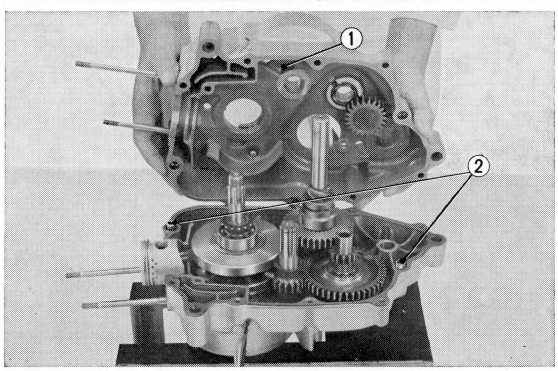


Fig. 2.45 ① R crankcase ② Dowel pins

C. Reassembly (PC 50)

1. Assemble the starter idle gear and shaft. **(Fig. 2.42)**
2. Install thrust washers at both ends and assemble the main shaft. **(Fig. 2.43)**
3. Install the countershaft assembly.

NOTE :

Before assemblying to the crankshaft, make sure that the operation of the free pawl is smooth. **(Fig. 2.44)**.

4. Install the pedal shaft assembly.

NOTE :

1. Make sure that all component parts are operating properly.
2. Do not forget to install the two 16mm thrust washer and one 25mm thrust washer.

5. Assemble the right crankcase and torque the mounting screws uniformly. **(Fig. 2.45)**

NOTE :

1. Make sure that the two dowel pins are installed.
2. Check for any damage to the crankcase cover mounting flange, also check to make sure that the breather vent is not clogged.
3. When difficulty is encountered in installing the right crankcase to the left crankcase, rotate the main shaft slowly to fully mesh the gears.

6. Assemble the friction spring to starter drive ratchet.
7. Install the drive sprocket to the countershaft.
8. Complete the reassembly in the reverse order of disassembly.

(PS 50)

1. Assemble the main shaft to the left crankcase. **(Fig. 2. 46)**

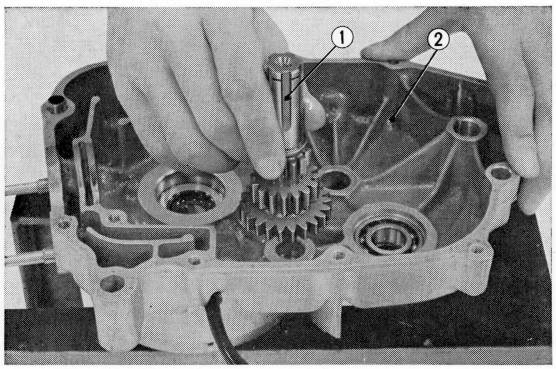


Fig. 2. 46 ① Transmission mainshaft
② R. crankcase

2. Mount the crankshaft.
3. Install the countershaft, top gear, second gear.
4. Assemble the chain across the countershaft low gear sprocket and the starter drive sprocket. Also, reassemble the pedal shaft assembly and countershaft.
5. Reassemble in the reverse order of disassembly. **(Fig. 2. 47)**

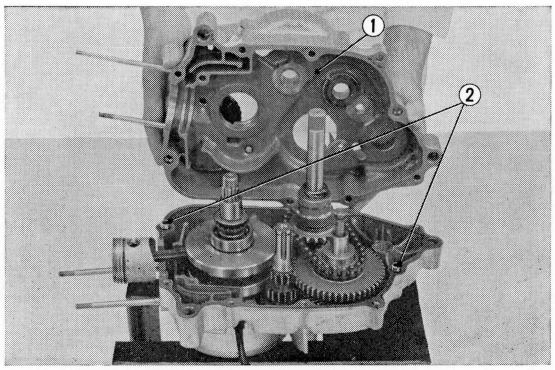


Fig. 2. 47 ① R. crankcase ② Dowel pins

D. Disassembly of cam chain tensioner, oil guide

1. Remove cylinder, refer to section 2.2 E.
2. Remove clutch.
3. Tensioner arm may be removed by filing off the headed rivet. **(Fig. 2. 48)**
4. Remove the oil guide.

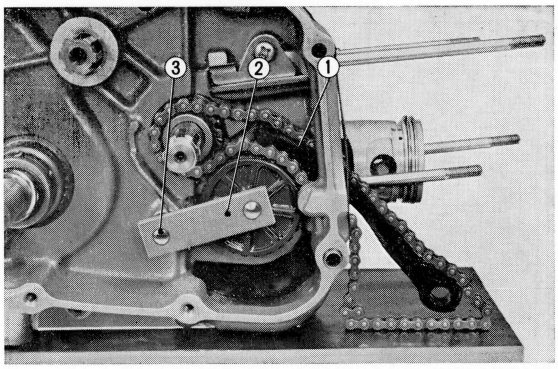


Fig. 2. 48 ① Oil guide ③ Headed rivet
② Tensioner arm

E. Reassembly

1. When assemblying the tensioner arm, use a new rivet and peen over the end.
2. Check the movement of the tensioner arm after installing the chain tensioner spring.
3. Check the tension of the cam chain.

F. Disassembly of the crankshaft

1. Remove cylinder, refer to section 2.2 E.
2. Remove the reduction unit, refer to section 2.2 A.
3. Remove dynamo cover.
4. Remove flywheel.
5. Separate the right crankcase.
6. Separate the crankshaft from the left crankcase. **(Fig. 2. 49)**

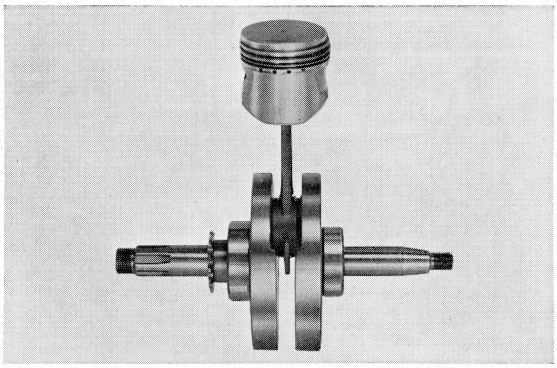


Fig. 2. 49 Crankshaft assembly

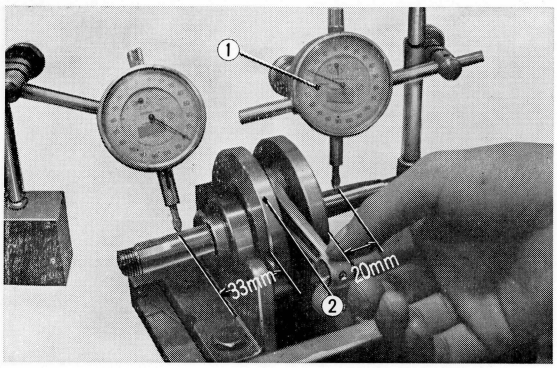


Fig. 2. 50 ① Dial gauge ② Crankshaft

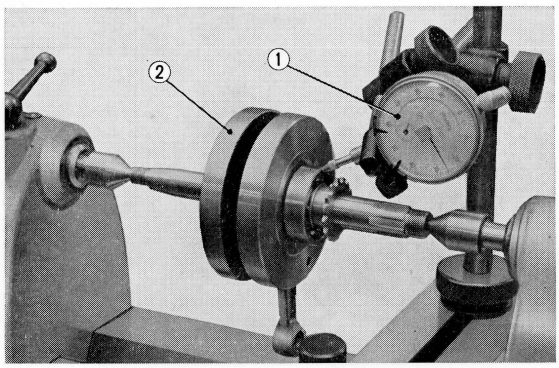


Fig. 2. 51 ① Dial gauge ② Crankshaft

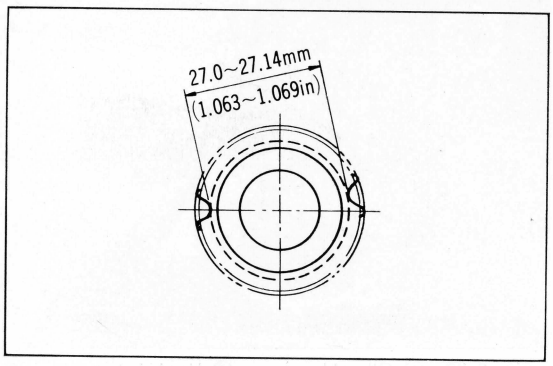


Fig. 2. 52 No. of teeth : 15

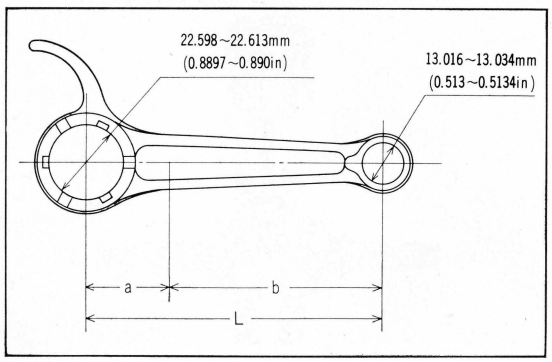


Fig. 2. 53 Dimensions of connecting rod

G. Inspection and Repair

1. Support the crankshaft on v-blocks at the bearings and inspect for run-out. **(Fig. 2. 50)**

Item	Standard value	Serviceable limit
Left crankshaft at 20 mm (0.8 in)	TIR 0.014 (0.0006 in)	0.05 max. (0.002 in)
Right crankshaft at 33 mm (1.3 in)	TIR 0.023 (0.0009 in)	0.05 max. (0.002 in)

2. Support the crankshaft on centers and inspect the bearing for wear in both the parallel and normal direction of crankshaft. **(Fig. 2. 51)**

Item	Standard value	Serviceable limit
Parallel direction	0.07~0.2 (0.003~0.009 in)	0.1 max (0.004 in)
Normal direction	0.007~0.022 (0.0003~0.0009 in)	0.05 max. (0.002 in)

3. Crank pin

Item	Standard value	Serviceable limit
Diameter	18.598~18.61 (0.7322~0.7327 in)	18.55 (0.7309 in) min
Interference fit	0.06~0.09 (0.0024~0.0035 in)	———

4. Timing sprocket root diameter. **(Fig. 2. 52)**
Standard value : 27.00~27.14 (1.063~1.069 in)

5. Connecting rod small end. **(Fig. 2. 53)**

Item	Standard value	Serviceable limit
Inner dia	13.016~13.034 (0.5130~0.5134 in)	13.08 max. (0.5154 in)

6. Clearance between connecting rod small end to piston pin.

Item	Standard value	Serviceable limit
Clearance	0.02~0.04 (0.0008~0.0016 in)	0.08 (0.0032 in) max.

7. Connecting rod small end run-out.

Item	Standard value	Serviceable limit
Run-out	0.15~0.35 (0.0059~0.0138 in)	1.50 (0.0591 in) max.

8. Clearance at connecting rod large end.

Item	Standard value	Serviceable limit
Clearance	0.00~0.01 (0.000~0.0004 in)	0.03 (0.0012 in) max.

H. Reassembly

1. Assemble the crankshaft and other component parts.
2. Assemble right crankcase after making sure that the two hollow dowel pins are installed.

NOTE :

Check to make sure that the crankcase is clean and free from foreign matters and damage to gasketing surface.

3. Complete the reassembly in the reverse order of disassembly.

A. Adjustment Procedure

1. Air screw

Screw in fully and then back off $1\frac{1}{8} \sim 1\frac{3}{8}$ turn.

2. Throttle stop screw

Loosen the throttle screw fully and then screw in to obtain the proper idle speed of 1500 RPM. Determine the proper idle speed by running the engine

3. Slow speed adjustment

Adjust the engine to smooth operation with the air screw and then adjust to the proper idle speed with the throttle stop screw.

4. Medium and high speed adjustment

Adjust with the main jet.

If exhaust gas is dark, replace main jet with one of smaller number and visa versa.

NOTE :

Jets are precision parts, therefore, handle with care to prevent damage. Finally, check the fuel level.

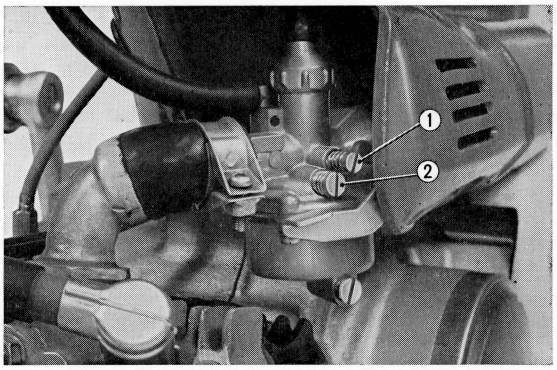


Fig. 2. 54 ① Throttle stop screw ② Air screw

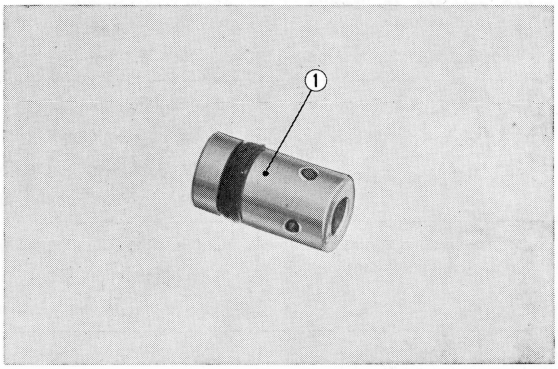


Fig. 2. 55 ① Main jet

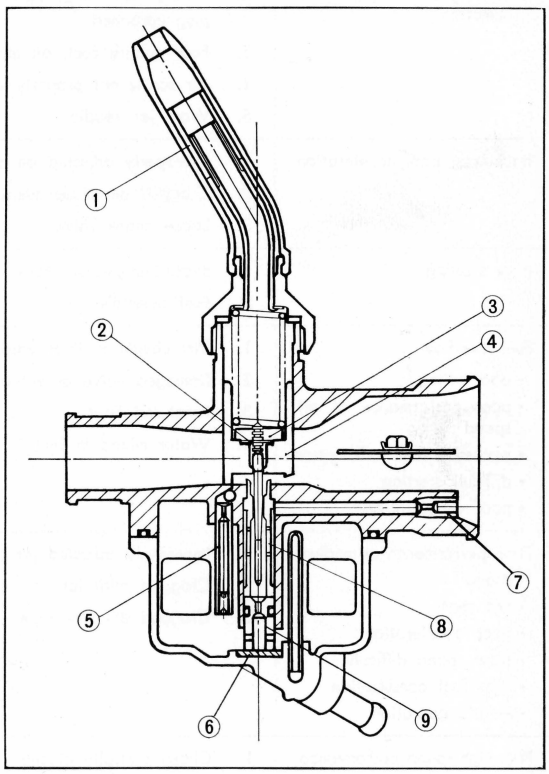
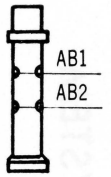
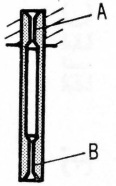
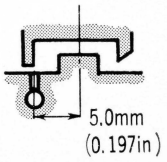


Fig. 2. 56
① Cable adjuster
② Needle clip
③ Needle clip plate
④ Throttle valve
⑤ Pilot jet
⑥ Packing
⑦ Air jet
⑧ Needle jet
⑨ Main jet

B. Trouble Shooting

Trouble	Probable cause	Corrective action
Engine will not idle	1. Clogged fuel tank cap breather hole 2. Air leaking in from connecting tube 3. Clogged air cleaner 4. Improper fuel level 5. Clutch will not disengage 6. Tappet clearance out of adjustment	1. Repair 2. Repair 3. Repair 4. Adjust 5. Adjust 6. Adjust
Idling out of adjustment • slow speed • erratic idling • no response to throttle snap • engine dies during braking	1. Air screw out of adjustment 2. Throttle stop screw out of adjustment 3. Clogged pilot jet, or loose jets	1. Adjust 2. Adjust 3. Clean repair
Engine stops suddenly while running	1. No fuel in tank 2. Clogged fuel cock 3. Dirty spark plug (Carboned or wet) 4. Spark plug points being shorted	2. Clean 3. Adjust or replace 4. Clean or repair
Excessive smoking during medium and high speed	1. Loose main jet, clogged jet 2. Worn jet needle 3. Jet needle dropped from holder	1. Reduce size of main jet 2. Lower jet needle one groove 3. Repair
Excessive exhaust smoke, after fine, high fuel consumption	1. Choke not fully opened 2. Wrong heat range spark plug used, or plug carboned 3. Poor quality fuel, oil mixed fuel 4. Air screw not properly adjusted 5. Worn jet needle	2. Replace or clean 4. Adjust 5. Adjust or replace
Back-fires, poor acceleration	1. Improperly adjusted air screw 2. Clogged air bleed system 3. Loose choke valve	1. Adjust 2. Clean 3. Slightly over-tighten the choke valve
Poor starting	1. Excessive use of choke 2. Fuel overflow	1. Start without choking 2. Refer to section 2, float gauge
Fuel overflow • poor idling • poor performance at all speed • excessive fuel consumption • difficult starting • poor acceleration	1. Dirt caught in float valve 2. Damaged valve or valve seat 3. Punctured float 4. Water mixed in fuel	1. Clean 2. Replace 3. Replace 4. Drain and clean tank
Poor performance at medium speed • flat spot • poor acceleration • slow speed difficult • high fuel consumption • erratic operation	1. Improperly adjusted jet needle 2. Clogged pilot jet 3. Clogged air vent pipe	1. Set clip to the third groove on the needle with possible one groove difference for winter and summer 2. Clean or repair 3. Over flow pipe servesales as air vent; prevent from blocking
Poor high speed performance	1. Choke partially closed 2. Clogged air vent pipe 3. Loose main jet, dropped or clogged 4. Jet needle dropped	1. Fully open the choke valve 2. Refer to part 2.4 above 3. Clean main jet and fix securely 4. Replace jet needle clip

C. Carburetor Setting Table

Item	Description				
Motorcycle model	PC 50	PC 50 (Holland type)	PS 50	PS 50 (Holland type)	
Main bore dia.	10 mm	9 mm	10 mm	9 mm	
Setting mark	C 5 A	C 4 A	S 5 A	S 4 A	
M. J. (Main jet)	# 55	# 55	# 55	# 55	
A. J. (Air jet)	# 100	# 100	# 100	# 100	
A. B. (Air bleed)	AB 1 0.5 mm × 2 AB 2 0.4 mm × 2	AB 1 0.5 mm × 2 AB 2 0.4 mm × 2	AB 1 0.5 mm × 2 AB 2 0.4 mm × 2	AB 1 0.5 mm × 2 AB 2 0.4 mm × 2	
N. J. (Needle jet)	2.8 mm (Recess dia.) 1.5 mm (Recess depth)	2.8 mm (Recess dia.) 1.5 mm (Recess depth)	2.8 mm (Recess dia.) 1.5 mm (Recess depth)	2.8 mm (Recess dia.) 1.5 mm (Recess depth)	
J. N. (Jet needle)	015301-3 Step	015303-3 Step	015301-3 Step	015303-3 Step	
TH. V. (Throttle valve)	CA # 2.5 Cutaway width 1.2, depth 0.2	CA # 2.5 Cutaway width 1.2, depth 0.2	CA # 2.5 Cutaway width 1.2, depth 0.2	CA # 2.5 Cutaway width 1.2, depth 0.2	
A. S. (Air screw)	$1\frac{1}{4} \pm 1/8$	$1\frac{1}{8} \pm 1/8$	$1\frac{1}{4} \pm 1/8$	$1\frac{1}{8} \pm 1/8$	
P. J. (Pilot jet)	2 step taper A # 35 inlet B # 45	2 step taper A # 35 inlet B # 38	2 step taper A # 35 inlet B # 45	2 step taper A # 35 inlet B # 38	
V. S. (Valve seat)	0.8 mm	0.8 mm	0.8 mm	0.8 mm	
P. O. (Pilot outlet)	P. O. Dia. 0.8 mm P. O. Location 5.0 mm	P. O. Dia. 0.8 mm P. O. Location 5.0 mm	P. O. Dia. 0.8 mm P. O. Location 5.0 mm	P. O. Dia. 0.8 mm P. O. Location 5.0 mm	
Fuel level	4 mm	4 mm	4 mm	4 mm	

3. ELECTRICAL SYSTEM

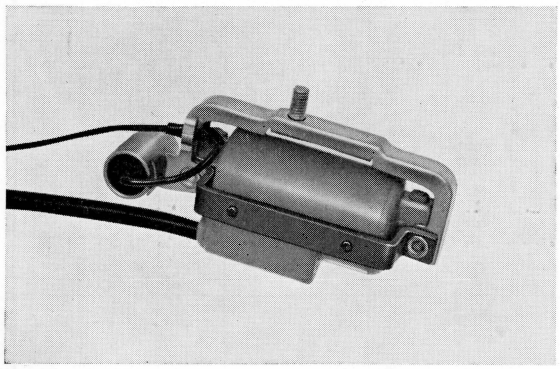


Fig. 3.1 Ignition coil

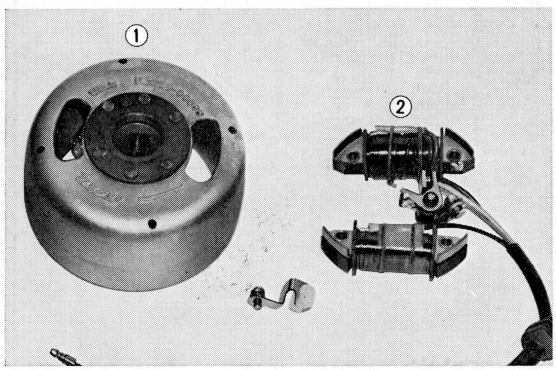


Fig. 3.2
① Flywheel ② Coil

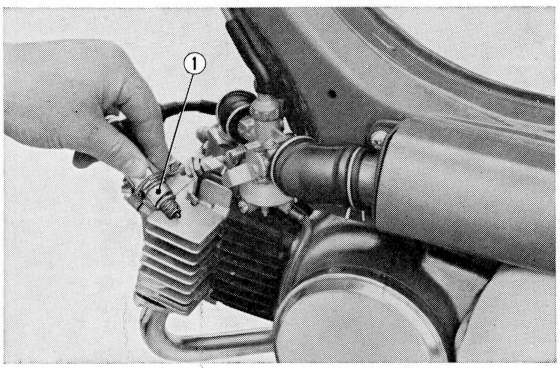


Fig. 3.3
① Spark plug

In order for a gasoline engine to operate, fuel mixture must be ignited by one of several methods so that the fuel mixture can be burned to produce useful work.

The PC/PS 50 utilizes A. C. ignition system, employing an A. C. generator and ignition coil. In this system, the A. C. current produced by the A. C. generator is interrupted to supply the primary voltage to the primary coil of the externally mounted ignition coil where the high voltage is induced for the ignition. This system differs from the conventional ignition system where the D. C. current is supplied to the ignition coil.

The chart on the following page lists the electrical system troubles and guides to corrective action.

A. Inspection of Spark Characteristic

The use of the A. C. ignition system makes it imperative that the inspection of the ignition coil be made by using the A. C. generator.

1. First, check to see that the high voltage is being delivered to the spark plug. Ground the spark plug on the engine as shown in **Fig. 3. 3** and perform the starting process. If bluish white spark is seen jumping across the plug points, it is an indication that the spark plug, ignition coil, flywheel, A. C. generator are in good condition.

   If there are no sparks ; one or more of the components are defective.
2. The primary coil may be checked for condition by the use of a lamp.

   Connect a 6 V–3 W bulb across the black lead from the generator and the ground and start the engine. If the bulb does not light up, there is an opening in the black lead or else the coil is defective. However, if the bulb continues to stay lit, the ignition coil or the breaker point is defective.

Electrical Trouble Shooting

Trouble	Probable cause	Corrective action
Engine will not start • No spark at the plug • Weak spark	1. Spark plug improperly installed 2. Plug electrode dirty or eroded 3. Plug gap too wide 4. Dirty breaker point 5. Improper ignition timing 6. Defective condenser 7. Decrease of magnetic force in the flywheel 8. Defective primary coil 9. Leaky high tension cord 10. Defective ignition coil 11. Insulation failure in ignition coil	1. Reinstall 2. Clean or replace 3. Repair or replace 4. Repair or replace 5. Adjust 6. Replace 7. Replace 8. Replace 9. Replace 10. Replace 11. Repair
Engine will not increase in speed	1. Improper ignition timing 2. Defective plug (wet)	1. Adjust 2. Clean or replace
Excessive engine speed	Defective governor (Holland type)	Repair or replace
Fire emitted from muffler	1. Too rich a fuel mixture 2. Excessive carbon deposit	1. Adjust carburetor and clean plug or replace Refer to section 6 for spark plug check
Breaker points readily burns	1. Points covered with oil 2. Improper point gap 3. Improper ignition timing 4. Condenser internally shorted 5. Improper capacity condenser	1. Clean 2. Adjust 3. Adjust 4. Replace 5. Replace
Horn inoperative	1. Open connection 2. Defective horn switch contact 3. Defective light switch contact 4. Defective horn	2. Repair or replace 3. Repair or replace 4. Repair or replace
Stop lamp defective	1. Broken bulb filament, connector unplugged 2. Defective stop switch contact 3. Defective lighting switch contact	1. Repair or replace 2. Replace 3. Repair or replace
Head light bulb filament burned	1. Open tail light circuit causing excessive voltage	
Head light defective (also same for tail light)	1. Bulb filament broken, connector unplugged 2. Poor socket contact, burned contacts 3. Defective lighting switch contact 4. Loss of magnetism in AC generator 5. AC generator lamp coil defective	1. Repair by raising the contact 2. Replace 3. Repair or replace 4. Remagnetize or replace 5. Replace
Light beam center dark	Improper bulb installation	Adjust focus
Lens and reflector clouded	1. Fogged 2. Dust	Clean the lens and reflector surface (after removing socket)

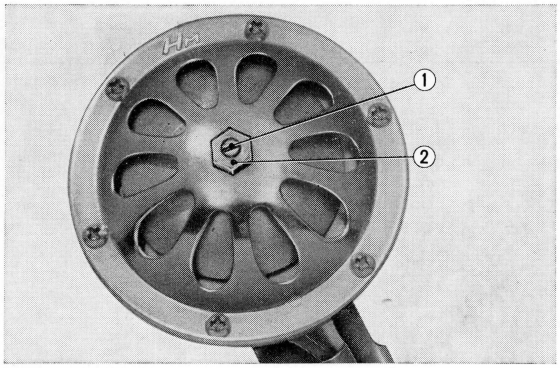


Fig. 3. 4
① Screw ② Nut

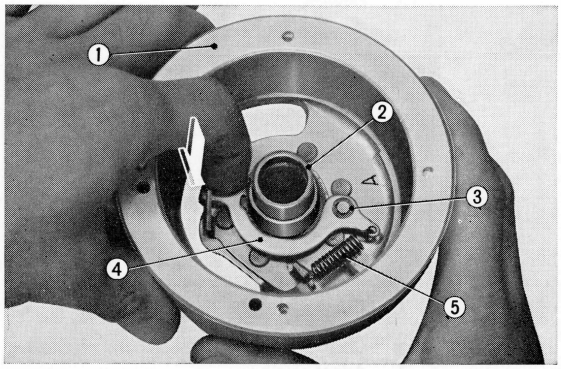


Fig. 3. 5
① Flywheel ④ Governor weight
② Cam ⑤ Governor spring
③ Snap washer

Specification and Performance

Type : A. C. ignition system
Ignition characteristics :

Engine RPM	Spark length/3 point spark gap tester
500	6 mm (0.236 in) min.
3,000	8 mm (0.315 in) min.

B. Inspection of Horn

The horn trouble are either no sound, poor tone or insufficient loudness.

1. If there is no sound : check for poor electrical connections, horn switch (grounding).
2. Insufficient loudness : adjust the current control screw on back of the horn. **(Fig. 3. 4)**
   Turn to the right to decrease loudness and to the left to increase loudness.
3. Check point and coil : disconnect the leads at the horn terminal and measure the resistance across the terminals. It should register about 1 ohm resistance.

C. Inspection of Governor

The cam should move smoothly when governor weight is forced in the direction of the arrow **(Fig. 3. 5)** and should also return smoothly when released. If the operation is not smooth, remove the snap washer and clean the inside of the cam, and check to see that the cam inside surface is not scratched or coated with metallic dust.

4. FRAME

Front Fork, Front Wheel, Front Cushion, Rear Wheel

Trouble	Probable cause	Corrective action
Steering stability is very poor	1. Improper tire pressure	1. Front tire 1.3 kg/cm^2 (18.5 lb/in^2) Rear tire 1.7 kg/cm^2 (24.2 lb/in^2)
	2. Loose handle mounting bolt	2. Retorque, refer to chart on page 53 and 59
	3. Loose front axle	3. Retorque
	4. Loose ball race	4. Retorque
	5. Rear axle not properly tightened	5. Retorque
	6. Loose front suspension pivot bolt (PC 50)	6. Retorque
	7. Loose spoke	7. Replace, refer to section A
	8. Distorted rim	8. Repair or replace
	9. Worn front wheel bearing	9. Replace
Noise originating in the cushion	1. Lack grease at the pivot and front cushion bottom (PC 50)	1. Apply grease
	2. Loose cushion mountings	2. Retorque
Front brake inoperative	1. Front brake arm out of adjustment	1. Adjust to 1.0～1.5 cm (0.40～0.60 in) free play at end of lever
	2. Lining not fully contacting, worn	2. Repair or replace
	3. Oil on drum	3. Clean
Excessive vibration when rear brake applied	1. Loose rear axle shaft nut	1. Retorque
	2. Loose rear axle bolt	2. Retorque
	3. Worn torque arm mounting hole	3. Replace
Pedal inoperative	1. Rear brake dragging	1. Adjust
	2. Disconnected or broken drive chain	2. Repair or replace
	3. Locked free pawl	3.
	(1) Weakened free pawl spring	(1) Replace
	(2) Broken free pawl	(2) Replace
	4. Bent rear axle	4. Repair or replace

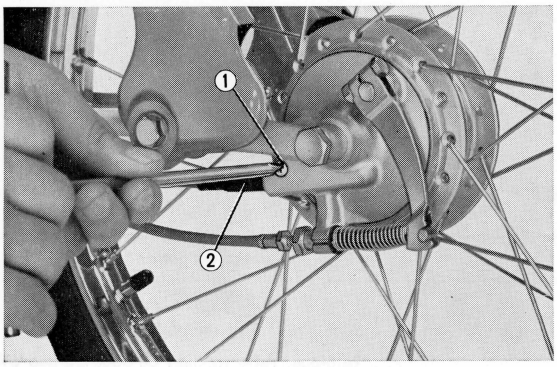


Fig. 4.1 ① 4×16 cross screw
② Speedometer cable

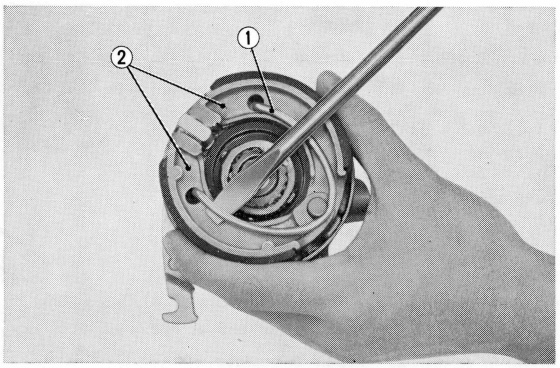


Fig. 4.2 ① Front brake shoe spring
② Front brake shoe

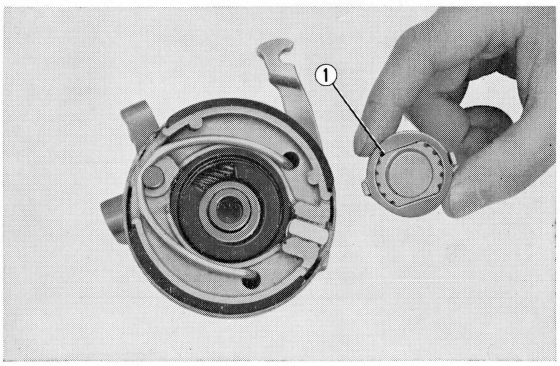


Fig. 4.3 ① Speedometer gear

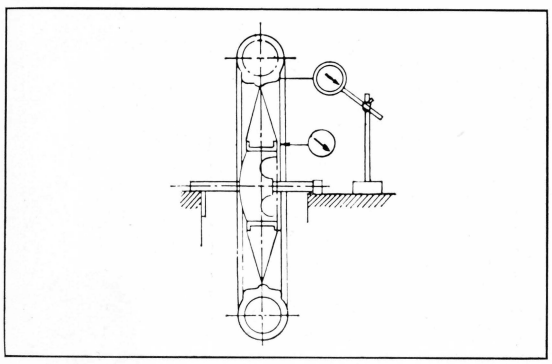


Fig. 4.4 Measuring rim runout

A. Disassembly of Front Wheel (PC/PS 50)

1. Disconnect the front brake cable from the brake panel.
2. Unscrew the 4×6 screw and disconnect the speedometer cable. **(Fig. 4.1)**
3. Remove the 10mm nut, draw out the front wheel axle and disassemble the front wheel.
4. Remove the brake shoe spring and disassemble the front brake shoes. **(Fig. 4.2)**
5. Remove the speedometer gear from the front brake panel. **(Fig. 4.3)**
6. Remove tire and tube from the rim with tire lever.

B. Inspection

1. Measure rim runout. **(Fig. 4.4)**

Item	Standard value	Serviceable limit
Side runout	0.6 mm (0.024 in)	1.0 mm (0.040 in)

2. Measure front axle diameter and bend.

Item	Standard value	Serviceable limit
Diameter	9.94～9.990 (0.3935～0.3933 in)	——
Bend	0.2 mm (0.008 in)	0.5 mm (0.020 in) max.

3. Remove any deep grooves and scratches from the drum contact surface and lining.

C. Reassembly

1. Assemble the speedometer gear.
2. Set brake shoe on the brake panel.
3. Assemble the tire flap over the spoke nipple. **(Fig. 4. 5)**
4. Assemble tube and tire.

NOTE :

a. After assemblying the tire and tube, fill tire with approximately 0. 5kg/cm^2 (7. 1 lb/in^2) of air and tap all around with a wooden hammer to prevent tube from being pinched. **(Fig. 4. 6)**

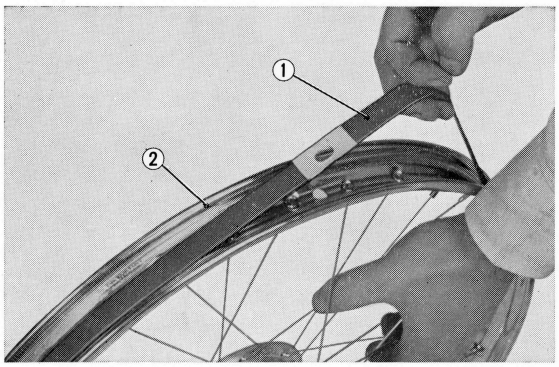


Fig. 4. 5 ① Tire flap ② Rim

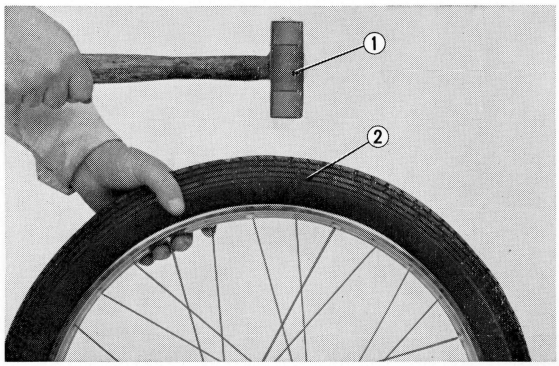


Fig. 4. 6 ① Wooden hammer ② Tire

b. The valve stem should be pointed toward the axle or else air will leak from the base of the stem. **(Fig. 4. 7)**

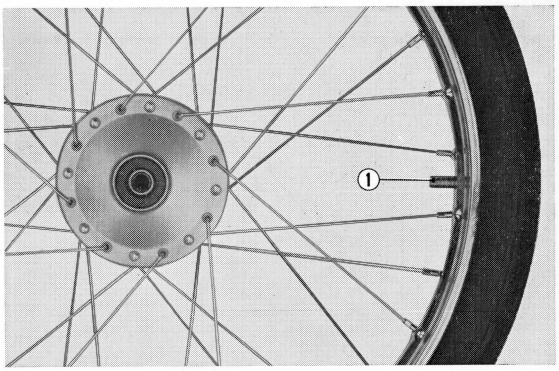


Fig. 4. 7 ① Valve stem

Tire pressure

Standard	front : 1.3 kg/cm^2 (18.5 lb/in^2)
	rear : 1.7 kg/cm^2 (24.2 lb/in^2)

5. Wash off old grease from the wheel hub and bearing, and pack both bearing and hub with new grease. Assemble the distance collar, 6201 ball bearing and oil seal. **(Fig. 4. 8)**
6. Fit the brake panel on the hub.
7. Assemble the front wheel on the fork, connect the speedometer cable and brake cable. Check the operation of the speedometer and made adjustment to the brake lever.

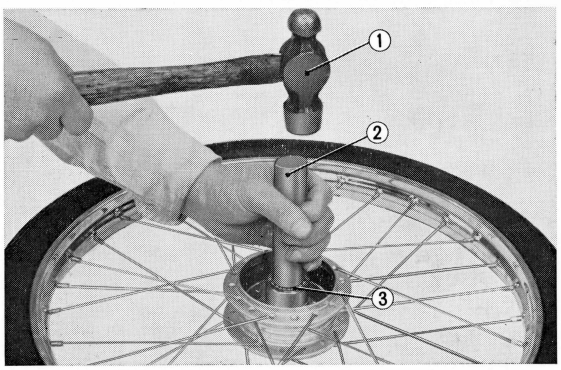


Fig. 4. 8 ① Ball peen hammer ② Bearing installer ③ 6201 ball bearing

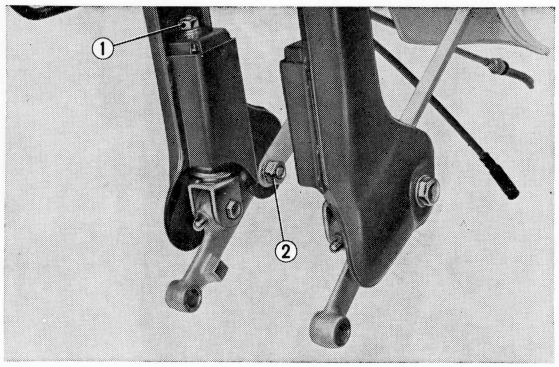


Fig. 4.9 ① 6mm nut ② 8mm nut

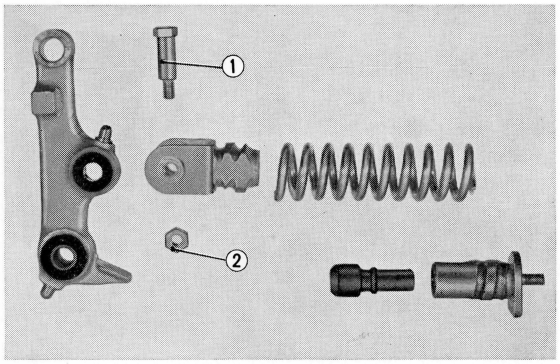


Fig. 4.10 ① Front cushion under bolt
② 6mm nut

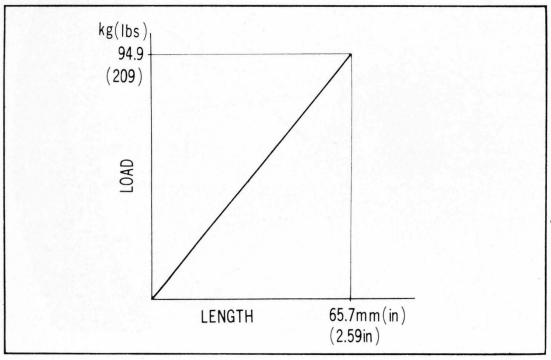


Fig. 4.11 Front cushion characteristic

D. Disassembly of Front Cushion (PC 50)

1. Disassemble the front wheel, refer to section 4. A.
2. Remover the 8mm and 6mm nuts mounting both the front cushion and fender.
3. Diassemble the front cushion assembly and suspension arm from the front fork. **(Fig. 4. 9)**
4. Remove the 6mm nut and loosen the front cushin under bolt, and the front cushion; can be disassembled. **(Fig. 4. 10)**
5. Front cushion characteristic. **(Fig. 4. 11)**

E. Reassembly

1. Assemble in the reverse order of removal.

NOTE:

a. Clean suspension arm and other parts, apply grease before assembly.

b. Apply grease with the grease gun after assembly.

F. Disasembly of Front Fork (PC 50)

1. Remove front wheel, refer to section 4. A.
2. Remove head light and disconnect all leads.
3. Remove horn.
4. Loosen handle set bolt and tap lightly to remove the handle. **(Fig. 4. 12)**

   *A tapered lock nut is fitted on the bottom of the handle pipe stem.

   As the handle setting bolt is tightened, the slotted handle pipe expands and locks on the front fork pipe.

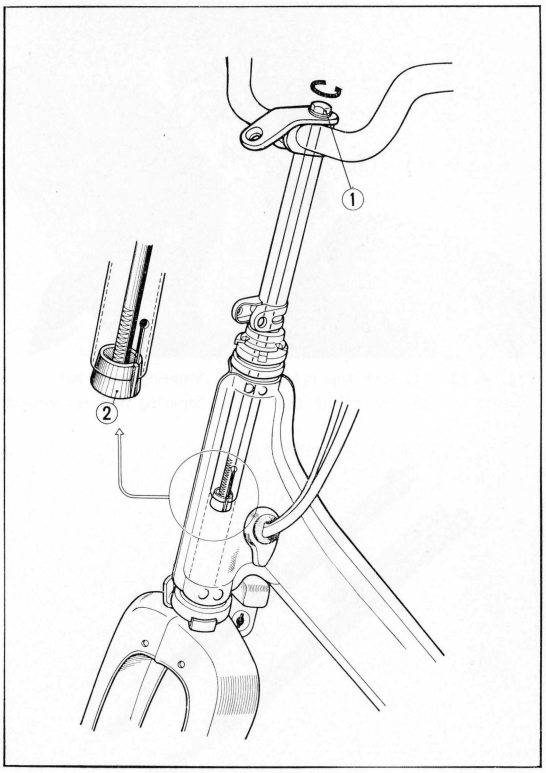


Fig. 4.12 ① Handle set bolt ② Lock nut

5. Loosen the stem nut, remove the top cone race and pull out the front fork. **(Fig. 4. 13)**

NOTE :

Watch for the steel balls which will drop out.

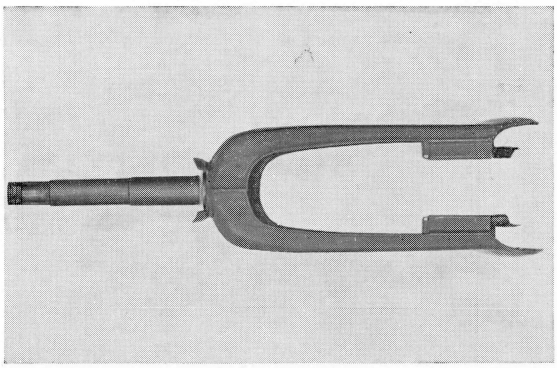


Fig. 4.13 Front fork

(PS 50)

1. Disconnect respectible cables, unscrew the four 8 mm handle pipe holder nut and remove the handle pipe. **(Fig. 4. 14)**

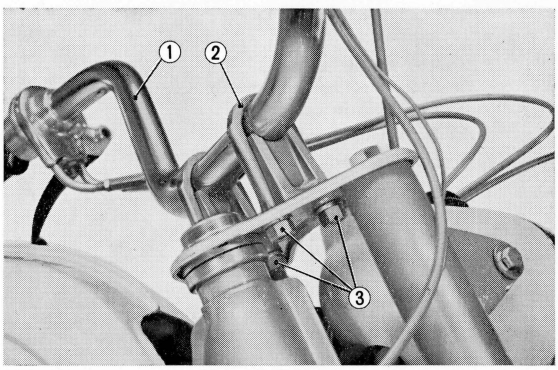


Fig. 4.14 ① Handle pipe ③ Handle pipe holder nut
② Handle pipe holder

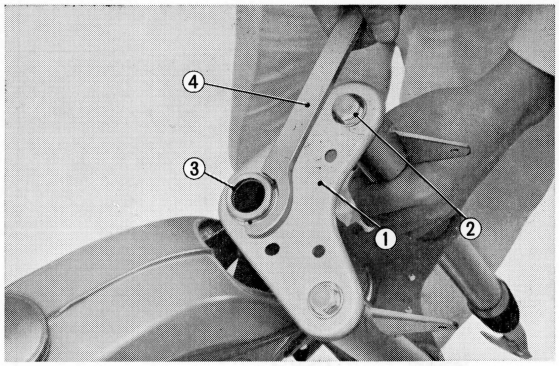


Fig. 4.15 ① Fork top bridge ③ Steering stem nut
② Front fork bolt ④ Steering stem nut wrench

2. Remove the front wheel and separete the front fender from the fork.
Refer to Section 4. A.
3. Disconnect the electrical wiring within the headlight case, and then, remove the headlight.
4. Remove the horn.
5. Unscrew the two 10 mm front fork bolts and steering stem nut, and then, remove the fork top bridge. **(Fig. 4. 15)**

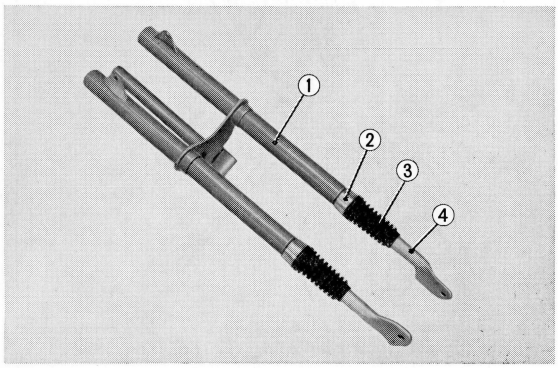


Fig. 4.16
① Front fork ③ Front fork boot
② Fork pipe guide cap ④ Front fork half slide pipe

6. Remove the steering top cone race by using the top cone spanner. (Special tool)
7. Remove the front fork assembly out from the bottom being careful not to loose the steel balls.
8. Remove the front pipe guide cap with use of the fork special tool, fork pipe guide wrench.
9. Remove the front fork pipe slide cap from the front fork. Disassemble front fork sequence of front fork boots, fork pipe guide cap, oil seal cap, and the fork pipe guide. **(Fig. 4. 16, 17)**

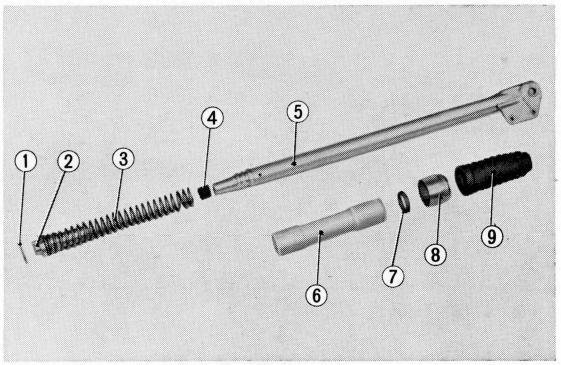


Fig. 4.17
① Seat washer
② Cushion spring upper holder
③ Front cushion spring
④ Front cushion stopper
⑤ Front fork half slide pipe
⑥ Fork pipe guide
⑦ Oil seal
⑧ Fork pipe guide cap
⑨ Front fork boot

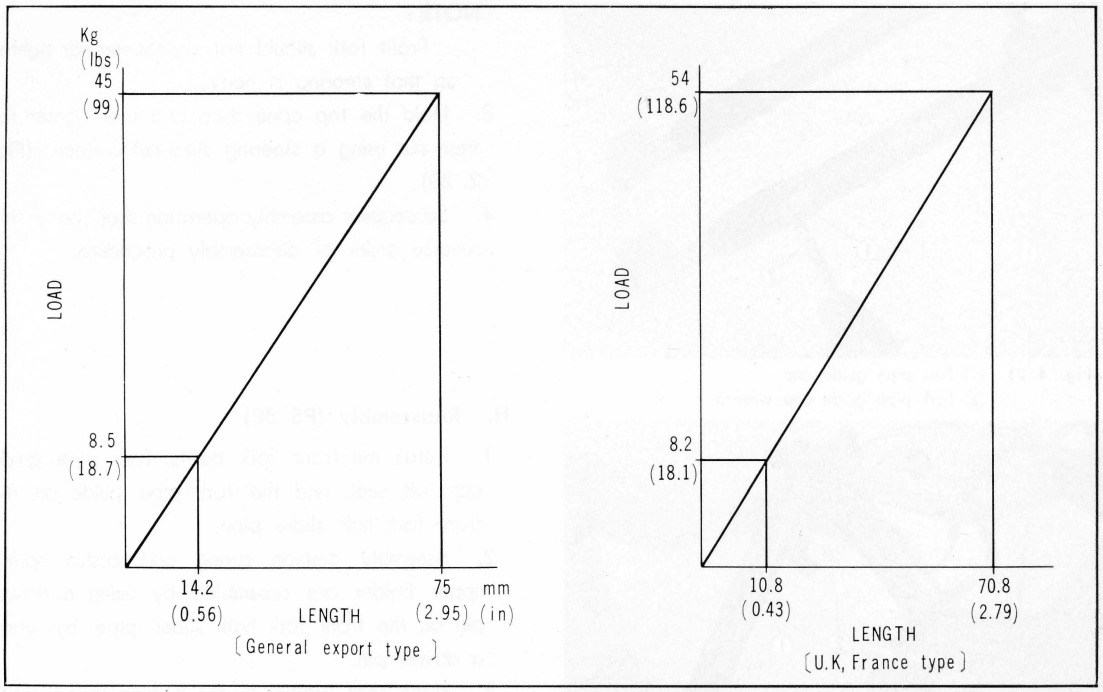


Fig. 4.18 Front cushion spring characteristic

10. The cushin spring and the cushion spring upper holder can be removed as an unit from the front fork half slider pipe. Further, it is assembled to the front fork slider pipe by dowel pin.

NOTE :

To facilitate reassembly, the front cushion spring and the cushion spring upper holder had better not to be disassembled.

11. Front cushion spring characteristics. **(Fig. 4. 18)**

G. Inspection

1. Bend in the handle pipe
2. Twist in the front fork
3. Distorted lock nut
4. Pressure failure of the ball race

H. Reassembly

1. Assemble 26 and 21 steel balls into the bottom and top cone races respectively with the use of grease. **(Fig. 4–19)**
2. Slide the front fork into the stem carefully and make sure that the steel balls are not dropped. Tighten the top cone race fully and then back off 1/4 turn.

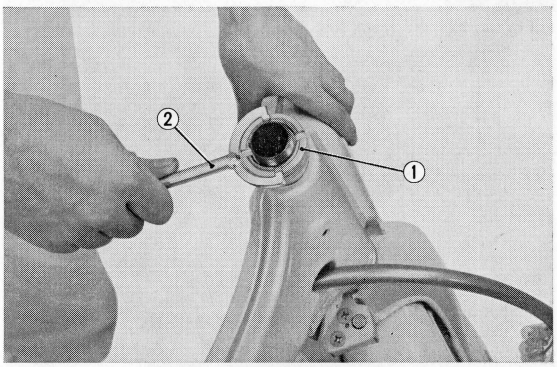


Fig. 4.19 ① Steering top cone race
② Top cone spanner

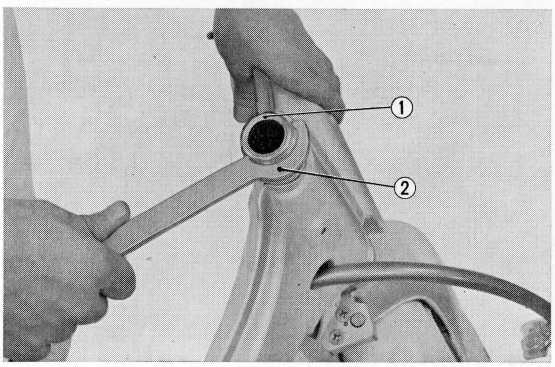


Fig. 4.20 ① Steering stem
② Steering stem nut wrench

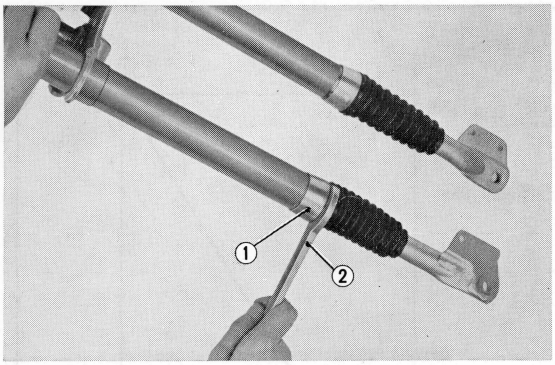


Fig. 4. 21 ① Fork pipe guide cap
② Fork pipe guide cap wrench

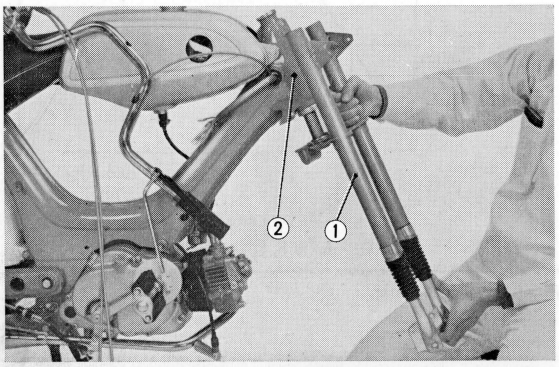


Fig. 4. 22 ① Front fork assy ② Head pipe

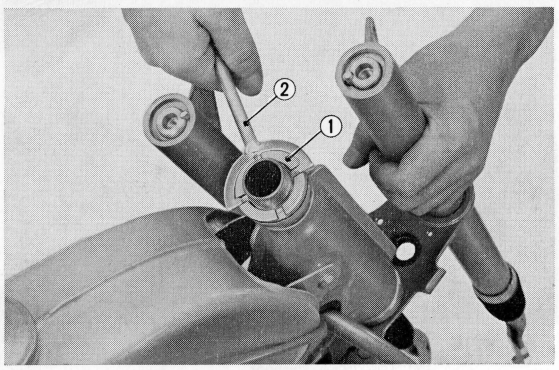


Fig. 4. 23 ① Steering top cone race
② Top cone spanner

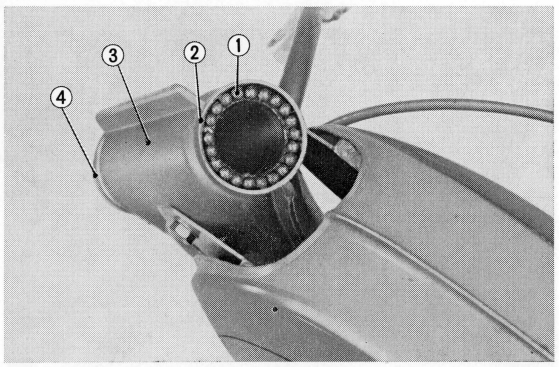


Fig. 4. 24
① Steel ball ③ Head pipe
② Steering top ball race ④ Steering bottom ball race

NOTE :

Front fork should not be loosen nor tighten so that steering is heavy.

3. Hold the top cone race and then tighten the stem nut using a steering stem nut wrench. **(Fig. 2. 20)**
4. Subsequent assembly operation shall be in the reverse order of disassembly procedure.

H. Reassembly (PS 50)

1. Install the front fork boots, fork pipe guide cap, oil seal, and the fork pipe guide on the front fork half slider pipe.
2. Assembly cushion spring and cushin spring upper holder are assembled by using a dowel pin on the front fork half slider pipe by using a dowel pin.
3. Place seat washer on the cushion spring upper holder and assemble onto the front fork using a special tool, fork pipe guide wrench. Install the fork pipe guide cap positively in place. **(Fig. 4. 21)**
4. Insert the front fork assembly into the head pipe being careful not to loose the steel balls. **(Fig. 4. 22)**
5. Using a special tool, top cone spanner, torque the steering top cone race. **(Fig. 4. 23)**

NOTE :

1. Lay steel balls into the cone races using grease to hold steel balls while preventing them from dropping. Assemble 21 steel balls in the top cone race and 26 steel balls in the bottom cone race. **(Fig. 4. 24)**
2. The proper torquing of the steering top cone race is to screw the cone nut completely and then back off 1/4 turn. If the cone is too loose, the steering will be hazardous and if it is too tight, the steering will be heavy.

6. Torque the fork top bridge with the two front fork bolts, using special tool and the steering stem nut.

NOTE :

When installing the fork top bridge to the front fork, insert the dowel pin located above the cushion spring upper holder into the fork top bridge dowel pin hole.

7. Install the horn, head light and then, connect the electric wiring.
8. Install the front fender and the front wheel.
9. Install the handle and connect cables to the corresponding connection.

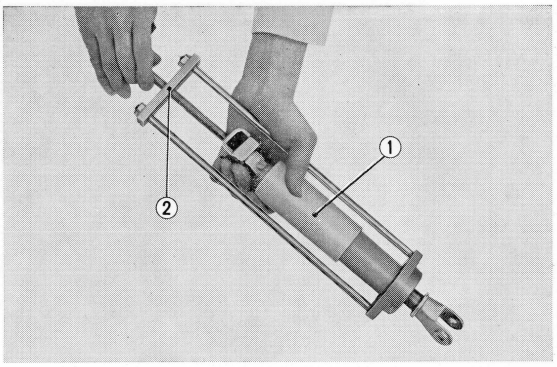


Fig. 4. 25 ① Rear cushion assembly
② Rear cushion assembling & disassembling tool

Rear Cushion (PC/PS 50)

I. Disassembly

1. Unscrew the 10 mm cap nut and the 8 mm bolts and remove the cushion assembly.
2. By using the cushion disassembly tool **(Fig. 4. 25)**, the rear cushion locking nut can be removed from the rear cushion bottom joint. Disassemble the rear cushion bottom case, rear cushion spring, rear cushion stopper rubber, and the cushion spring upper seat, the rear cushion upper case can be separated from the rear cushion damper. **(Fig. 4. 26)**
3. Rear cushion spring characteristics **(Fig. 4. 27)**

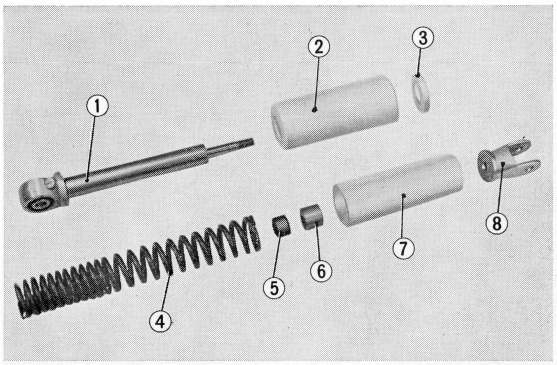


Fig. 4. 26
① Rear cushion damper
② Rear cushion upper case
③ Rear cushion spring upper seat
④ Rear cushion spring
⑤ Rear cushion stopper rubber
⑥ Rear cushion locking nut
⑦ Rear cushion bottom case
⑧ Rear cushion bottom joint

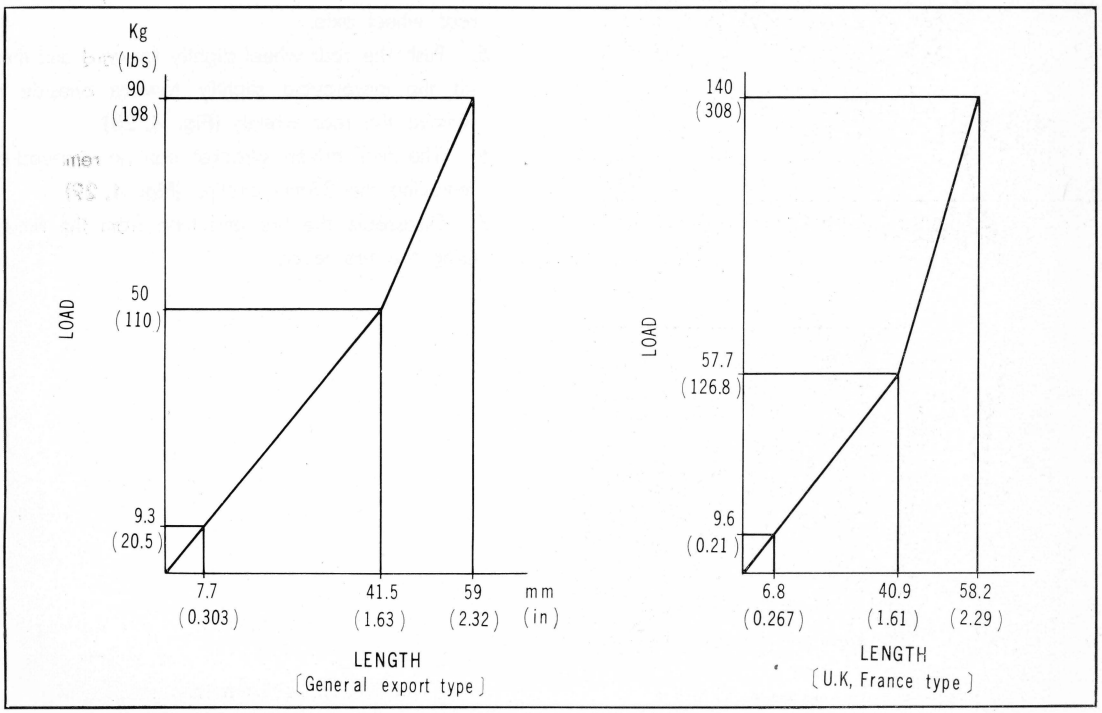


Fig. 4. 27 Rear cushion spring characteristic

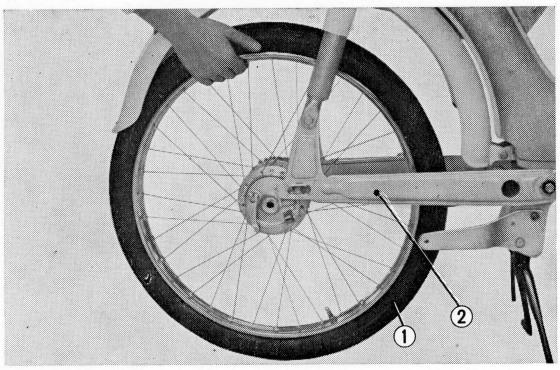


Fig. 4. 28
① Rear wheel ② Rear fork

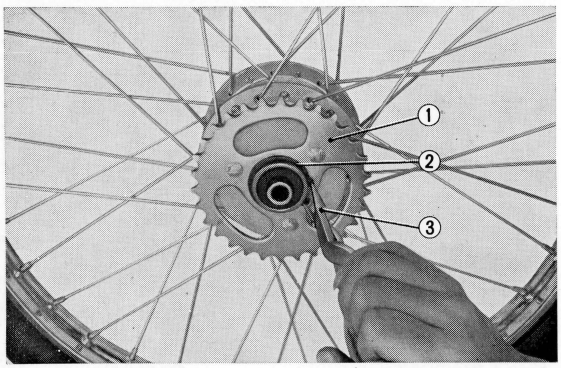


Fig. 4. 29
① Final driven sprocket ③ Snap ring plier (open)
② 38 mm circlip

J. Inspection

1. Rear cushion spring

	For England & France	For General Export
Item	Free length tension	Free length tension
Standard value	206.8 mm (8.14 in) 148.6 mm/140 kg (5.85 in/308 lbs)	207.7 mm (8.18 in) 148.7 mm/90 kg (5.85 in/198 lbs)
Serviceable limit	Replace if over 200 mm (7.87 in)	Replace if over 200 mm (7.87 in)

K. Reassembly

Perform the reassembly in the reverse order of disassembly.

NOTE :

The rear cushion spring is made with two different spring pitches, the end with the cross pitch is assembled toward the upper case.

(PC/PS 50)

L. Rear wheel disassebly

1. Remove the drive chain cover, and disconnect the chain by removing the drive chain clip with the pliers.
2. Loosen the chain adjuster nut.
3. Disconnect the rear brake cable at the rear brake arm.
4. Loosen the rear axle nut, and pull out the rear wheel axle.
5. Push the rear wheel slightly forward and then, tilt the motorcycle slightly toward oneside to remove the rear wheel. **(Fig. 4. 28)**
6. The final driven sprocket can be removed by removing the 38 mm circlip. **(Fig. 4. 29)**
7. Disasseble the tire and tube from the rim by using the tire lever.

M. Inspection (PC/PS 50)

1. Measure rim runout

Item	Standard value	Serviceable limit
Side runout	0.6 mm (0.024 in)	1.0 mm (0.04 in)

2. Measure front axle diameter and bend

Item	Standard value	Serviceable limit
Diameter	11.94~11.99 mm (0.470~0.472 in)	———
Bend	0.2 mm (0.008 in)	0.5 mm (0.02 in) max.

N. Reassembly (PC/PS 50)

1. Install tire flap on the rim.
2. Assemble the tube and tire.

NOTE :

Refer to the instruction for the front wheel.

3. Mount the final driven sprocket on the rear wheel hub with the 37 mm circlip.
4. Assemble the brake shoes into the rear wheel hub and then, install the rear brake panel.
5. Assemble the rear wheel side collar on the sprocket side and then, mount the wheel on the fork.
6. Install the rear wheel, install the drive chain adjuster on the rear wheel axle and mount the rear wheel on the fork.
7. Connect the rear brake cable to the rear brake arm.
8. Install the drive chain on the sprocket and connect the the chain ends with the chain clip.
9. Adjust the tension of the drive chain with the drive chain adjuster nut and then, tighten the axle nut.

NOTE :

1. The drive chain should be adjusted so that the tension will provide a play of 1 to 2 cm (0.4–0.8 in) at the center of the chain between the sprocket when a slight force is applied.
2. The drive chain should be adjusted with the chain adjuster ; so that the marks on both adjusters are positioned to the identical position marking on both sides of the fork.

O. Torquing Table

Item	Torque value	
	kg·cm	ft·lb
Engine		
Right crankcase	80～110	5.8～ 8.0
Drain plug	320～270	23.1～19.5
Clutch	380～450	27.5～32
Right crankcase cover	80～120	5.8～ 8.7
Cord clamp	60～ 90	4.3～ 6.5
Dynamo stator	20～ 40	1.5～ 2.9
Flywheel	180～250	13.0～18.1
Cylinder head	90～120	4.5～ 8.7
Cylinder head cover	80～110	5.8～ 8.0
Spark plug	110～150	8.0～10.8
Tappet adjusting nut	70～100	5.1～ 7.2
Tappet cap	90～130	6.5～ 9.4
Frame		
Front cushion pivot bolt	180～230	13.0～16.6
Front cushion bolts	80～110	5.8～ 8.0
Torque stopper bolt	200～250	14.5～18.1
Torque arm nut	40～ 70	2.9～ 5.1
Crank arm set pin	40～ 70	2.9～ 5.1
Handle setting bolt	250～350	18.1～25.3
Steering head stem nut	400～500	28.9～36.2
Seat bolt	200～250	14.5～18.1
Rear axle nut	400～600	28.9～43.4

HONDA MOTOR CO., LTD.

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PRINTED IN JAPAN